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AMSTRAD Computer User

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AMSTRAD
Computer User
The official magazine for Amstrad CPC Users

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April 1989

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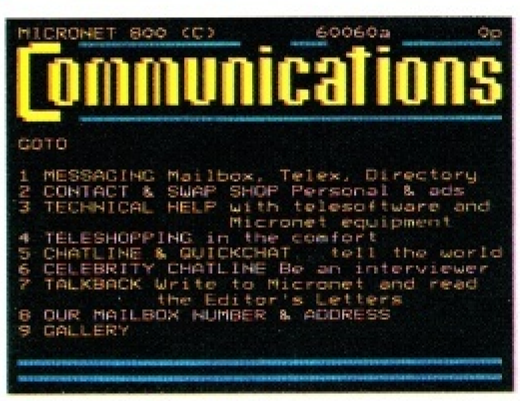
Take a look at the amazing competitions on pages 18, 37 and 41.

NB: All competitions close on May 1st 1989, – so be quick!

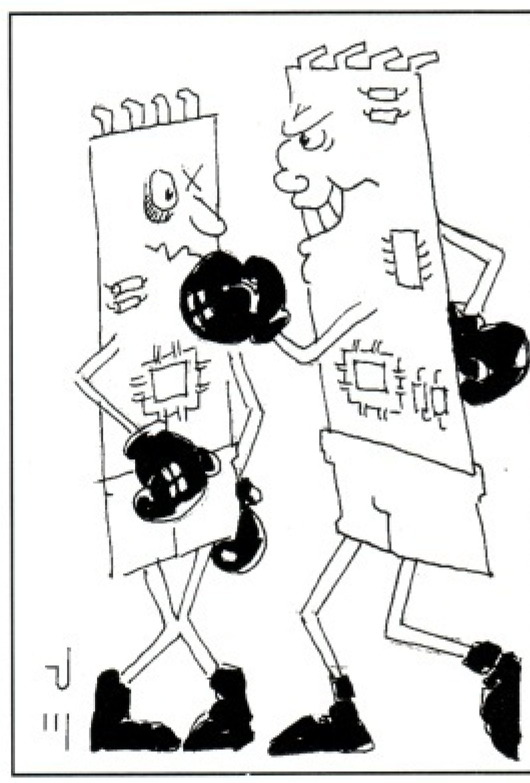
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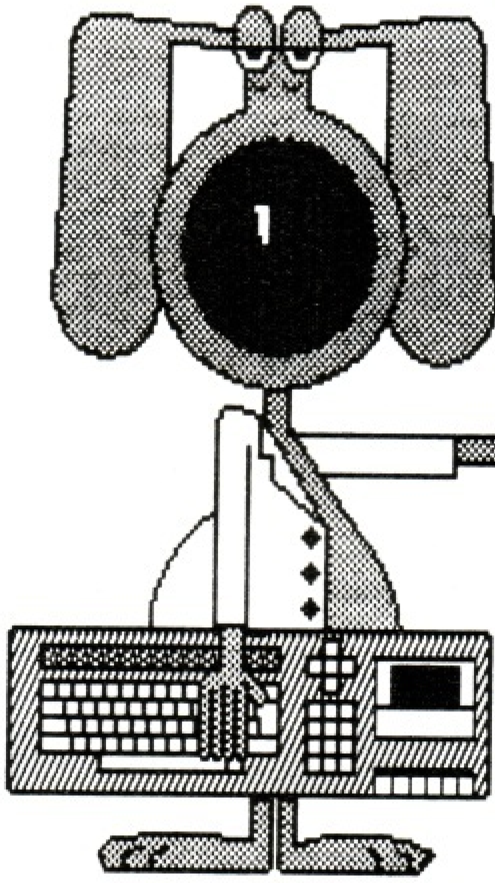
FEATURES



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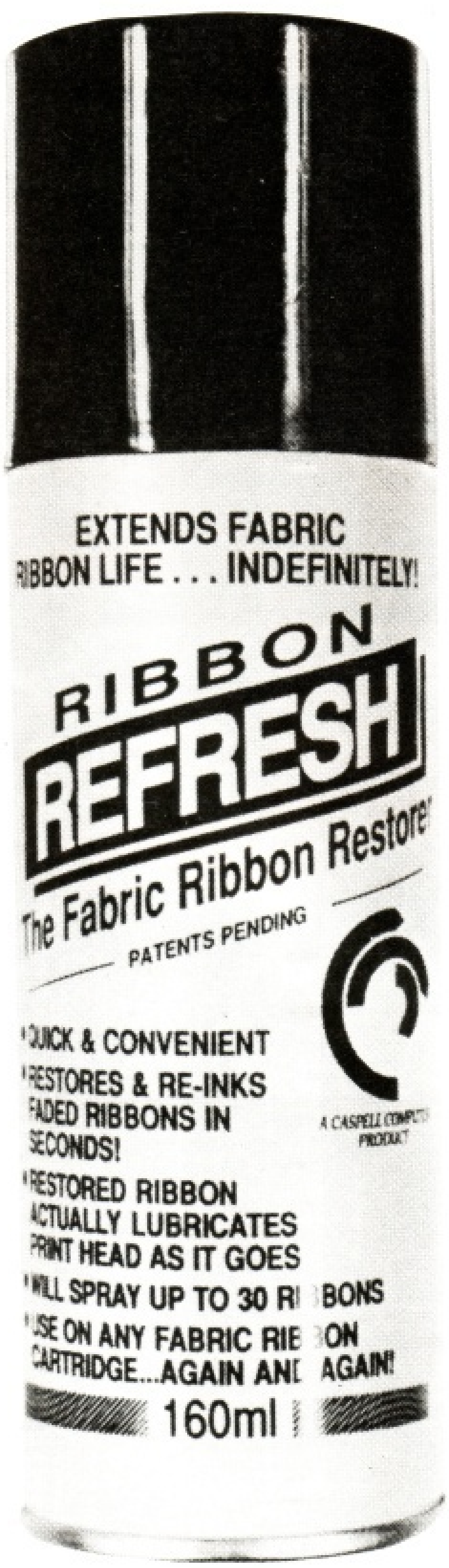
NEWS Computer User

New ribbons for old

CASPELL computerervices in Poole has released Ribbon Refresh, which the company claims will prolong life of fabric printer ribbons almost indefinitely. A mixture of inks, oils and organo-silicon compounds, the spray should restore ribbons for a few pence.

Any tired old ribbons can be treated with the spray and the quality of printing should improve dramatically. The process is more than just a re-inking – the compounds in Ribbon Refresh will lubricate the print head, and the spray may be used again and again.

Available by mail order, Ribbon Refresh costs £8.95 – or less if you order in bulk. The company claims "new" printer ribbons need only cost 35p. More information from Caspell on 0202 666155.



DISCBASE DATABASE

DISCBASE is an exceptional program offering a fast and effective discfile database for the Amstrad CPC series of computers. *Discbase* includes features such as entering of disc catalogues, making a database and fast update of changed disc files. It also features fast scrolling of display, wildcard searches, rapid searching, AND OR logic and efficient use of memory. Up to 1,200 filenames may be stored in one datafile and one or two disc drives may be used.

The program is run from a Main menu and disc utilities menu, xxxxx xxxxx xxxxx, erasing files, renaming files and wildcard directories. Discbase is available from Greyhound Software for £8.95.

For more information contact Greyhound Software, Kennel Cottage, Hockley Lane, Wingerworth, Chesterfield, Derby S42 6QQ. Tel: 0246 23533.

Mannesmann Launch

THE Qualitas Plus Utility Pack for CP/M Plus costs £9.95. For further information contact 0628 43445.

Mannesmann Tally has launched a new 80-column dot matrix printer called the MT81. If offers a print speed of 130 characters per second at 10 cpi, which the company claims is comparable to correspondence quality throught use of square instead of round dots in the 9-pin printhead. Furthermore, it is designed for workloads of up to 2000 pages per month. It is priced at £149.00 for further information contact 0734 788711.

Qualitas Plus

THE Qualities Plus print enhancer for Amstrad CPCs can now run on CP/M Plus as well as MSDOS due to its latest 'add-on' – the Utility Pack for CP/M Plus.

The pack contains loaders which install Qualitas Plus code and fonts as a permanent resident system extension (RSX) to the CP/M Plus operating system running on the Amstrad CPC6128. Other features include, two loaders to insure maximum compatibility with host programs, ZAPQUAL – which removes Qualitas if required – and QTYPE, a utility which can print ASCII files in pages, complete with headers, footers and page numbers.

The pack enables Qualitas Plus to run with the full CP/M Plus version of Protext and can be loaded direct from Protext command mode.

AMSTRAD CX100

AMSTRAD Plc has launched its first keyboard. The CX100. Like all Amstrad products it is reasonably priced at £129 and is targeted at family usage.

Features of the keyboard include a 'Playright' mode, which allows the user to accompany pre-arranged backing tracks which are available on data cassettes with a song book.

All Amstrad Fidelity audio systems have been designed to allow data transfer to and from the CX100 with a data socket on the back.

For further information contact Michael Joyce Consultants 01-836 6801.

As you will have noticed, ACU has moved to a new publisher, a new typesetter, a new printer, a new office. Need I say more!

We will be offering you the best CPC coverage possible each morning and you can look forward to bigger and more colourful issues in the future.

With the arrival of 16-bit computers in the past few years, many people have looked on 8-bit machines as just for games. We see the CPC as a great all-round machine capable of running small business and leisure software, as well as being an ideal programming machine. We will be offering long-term support for the CPC.

A magazine is there for its readers so if there is anything you want to see in these pages, write and let us know.

The Editor

GALLUP CHART

This week	Last week	Title	Publisher	Price
1	1	Operation Wolf	Ocean	£9.95
2	NE	Robocop	Ocean	£9.95
3	2	Thunder Blade	US Gold	£9.99
4	4	Giants	US Gold	£12.99
5	6	Advanced Pinball Simulator	Coop Masters	£1.99
6	5	Bomb Jack	Encore	£1.99
7	7	Joe Blade 2	Players	£1.99
8	RE	Yogi Bear	Alternative	£1.99
9	RE	Yabba Dabba Doo	Bugbyte	£1.99
10	RE	Through The Trap Door	Alternative	£1.99
11	RE	Air Wolf	Encore	£1.99
12	NE	Big Foot	Code Masters	£2.99
13	NE	Commando	Encore	£2.99
14	RE	Ghostbusters	Mastertronic	£1.99
15	RE	Super Stuntman	Code Masters	£1.99
16	RE	BMX Ninja	Alternative	£1.99
17	RE	Combat Lynx	Encore	£1.99
18	RE	Gauntlet	Kixx	£2.99
19	3	Last Ninja 2	System 3	£12.95
20	NE	Stunt Bike Simulator	Firebird	£1.99

WHICH GAME?

Virgin Mastertronic should just about have Obliterator ready to hit the high street stores. The plot goes something like this. You are an Obliterator, an elite genetically sculptured being, with enhanced senses and super-human strength. Obliterators are used as a last resort; every mission they perform is counted as a one-off suicide mission. Amazingly, you have managed to survive all your missions so far. So what is your mission this time! Destroy the space craft. Compared to previous adventures, this would be a piece of cake – but this is not any old space craft. After all, it did destroy the entire Federation Star Fleet! Obliterator will retail for £9.95.





Due out on the Mastertronic Ricochet label will be Hacker, Dan Dare II and Reveal. Hacker is a budget priced re-release of the original Activision game, which simulated hacking a computer system. A good way to do a bit of legal – and inexpensive – hacking in the wee small hours of the morning.

Dan Dare II is the return of the Mekon after more than a years peace. This time the Mekon had decided to invade the earth with a race of super-human beings, which he hopes will kill and hold captive the inhabitants of earth.





Reveal is an arcade puzzle in which you must settle against the clock and free alien worlds from the darkness which has beset them. To do this entails becoming a member of the Planetary Liberation Force, and destroying the enemies which vacate them.

Hacker, Dan Dare and Reveal will all retail for £1.99.

The interceptor budget label, Players, is about to release three new CPC games. The first will be the F14 simulator, entitles *Tomcat*. You are placed in the cockpit of the F14 and have to complete four levels of sheer hell by utilising your air-to-air, air-to-sea, and air-to-ground defences.

Along the way, you will encounter enemy helicopters, flak installations, gunboats and tanks, which must be destroyed before they destroy you. Each level terminates in a head-to-head confrontation with a mechanical barrage of firepower. The CPC version should be available by the time you read this, having been converted by Sonja Knight.

The next Players, title has an Eastern flavour. *Shanghai Warriors* places you as a graduate of the Dragon Temple Karate Academy who has to retrieve a stolen U.S. Navy submarine which has fallen into the hands of the Snide Gantree. Can you succeed where the CIA and the MI5 failed?

The Amstrad version is being developed as a true CPC version – not just a Spectrum to COC conversion. The game will be three-level multi-load.

The third title to be released by Players will be Task Force. Task Force is currently still under development, once again, be programmed by Sonja Knight. The game is apparently a Cybernoid style "blast-'em-up", featuring stunning backdrops, masses of enemy sprites, and various other nasties. Task Force should be available around March or April.

All Players games mentioned will retail for £1.99.



BAD DUDES VS.
DRAGONNINJA
T.M.
DATA EAST
Your Opponents in your battle for supremacy are four types of Evil Ninja star-throwing Assassins whose skills are manifold and dangerous. Also out to spoil your day are Acrobatic Women Warriors and vicious Guard Dogs. At the end of each level you must overcome the Ninja Master in order to progress – some examples of these superhuman villains are: A fire-breathing Fat Man, an Armour Clad Giant Ninja – who has a disconcerting habit of suddenly multiplying into an army!
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...the name of the game
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After Burner

MATT



After Burner was one of the arcade smash hits last year on many formats, and has now managed to make its way on to the CPC at long last. You pilot an F-14 Tomcat, armed with laser cannons and air-to-air missiles. Your mission is simple – just shoot anything which moves. While doing this you will encounter a number of enemy aircraft, including other fighters and helicopter gunships. If you survive the first barrage of enemies you will encounter a re-fuelling aircraft and proceed to the next level. All the levels are fairly similar, with occasional differences such as day or night back-drops and forest or desert landscape.

As far as the gameplay is concerned the Amstrad version of *After Burner* suffers from a lack of it. It is not that there is little variation in the theme – there is no real control over your F-14. All you need to do is dodge the occasional missile, keep your cannons firing and fire missiles when your computer locks on to an enemy aircraft.

Doing this will allow you to survive level after level. Even the roll option of previous versions does not seem to be fully implemented. Following the instructions in the manual does not work with this, in fact, to perform a roll seems to be more a fluke than any skilful manoeuvre.

The graphics are mediocre; they are very similar to the arcade original but still tend to be boring and repetitive. Sound is virtually non-existant, with the occasional bang or squelch. Even the title sequence suffers in the audio department.

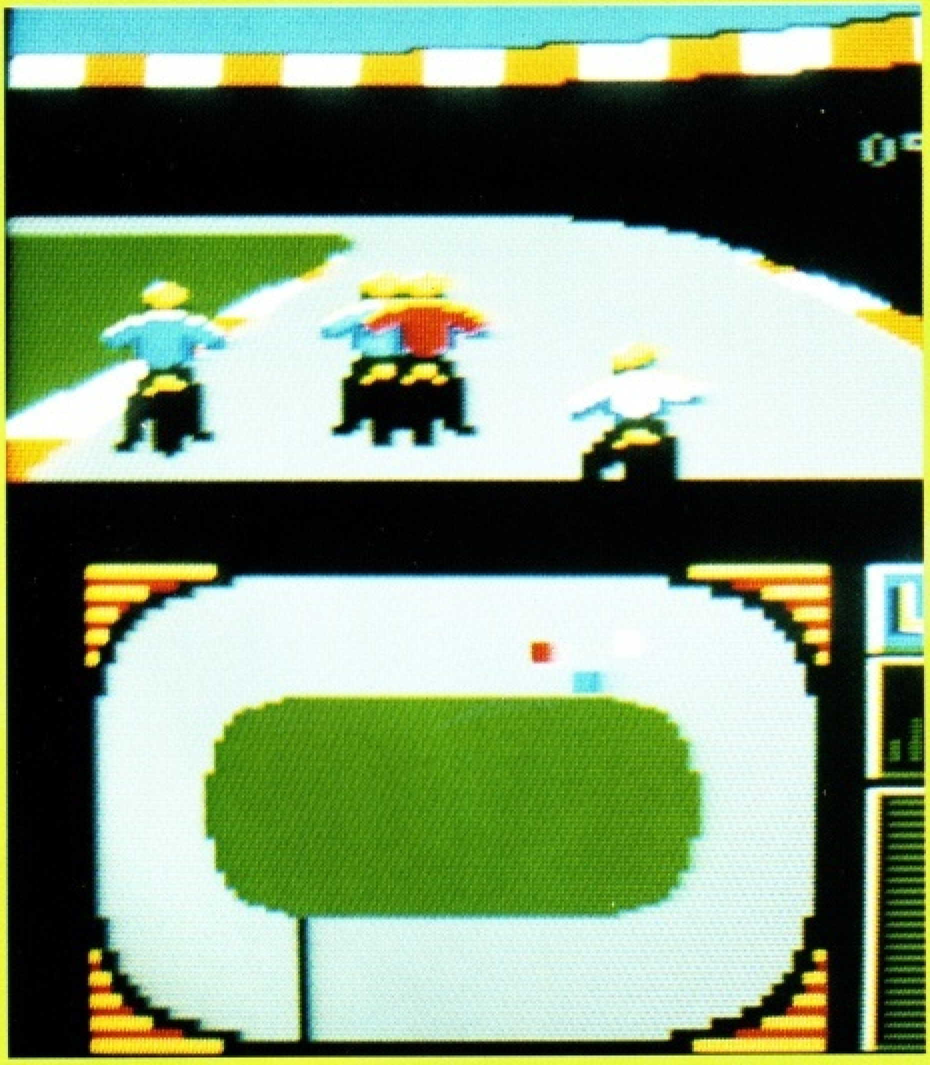
After Burner has proved to be something of a turkey on the Amstrad, which is a pity because some versions, namely the Sega console version – have been good. What happened, Activision?

Developer: Probe
Tape: £9.99
Disc: £14.99

6/20

speedway

ADRIAN



As you zoom away from the starting line you feel the wind whistle around your helmet and the uneveness of the road surface but this is not a simulation of driving along London's roads littered with potholes – it is *International Speedway* where winning is everything.

One thing is certain; you will not be a winner if you pay any more than the asking price. For the budget price of £1.99 you get a truly budget game with all the thrills and spills of a hangover.

International Speedway puts the player in the position of a newcomer to the dirt track. You have spent loads-a-money on your new scrambler motor cycle and are confident you can beat the opponents in your local league.

At the starting line you rev your two-stroke and wait for the green for go. Green and theu are off. Well, all except you, who just plods along until your cycle has reached running temperature.

The upper portion of the screen shows a view of your player on the track as if he were being trailed by a camera. The rest of the display is taken up by a plan view of the race in progress and some useless graphics along-side to fill otherwise empty space.

The view of the race gives little impression of speed, especially as the plan view of the oval shows small coloured squares shooting around it at speed, especially as the plan view of the oval shows small coloured squares shooting around it at fantastic speed.

I foundmy bike to have no brakes and was puzzled why it slowed automatically when approaching a corner and continued to slow the more you cut into it. Once out of the corner it accelerated to such speed that the straight was almost unnoticeable and the whole race seemed to be constant cornering.

Graphically the game is poor, especially seeing how much of the screen is wasted on unused illustrations. The sound effects leave much to be desired and the gameplay was so boring that I felt I could make some tea without missing anything. The unfortunate thing about many budget titles is thay they are always considered to be worth less development time; so the game appears to have been knocked up in two afternoons. International Speedway is no exception.

Developer: In house
Tape: £1.99

5/20

DRAGON N•I•N•J•A

RIK



Data East is a large arcade machine company, responsible for such classics as *Kung Fu Master, Express Raider* and the current hit *Robocop.* Another hit credited to it is Dragonninja, a highly enjoyable and very popular game in the beat-'em-up mould, which reached our shores about a year ago. It was similar to its other games, horizontal-scrolling fighting action – and the splash it caused in the arcades encouraged many companies to rip it off. Now Ocean has converted it to the Amstrad and the job is amazing.

The plot is very simple. You are a bad dude. You are so bad you do not even wear flares and you have heard a rumour that the president of the United States has been kidnapped. Like the good citizen you are, you have set out on the impossible task of rescuing him, which is probably the worst decision you ever made.

The person behind the terrible deed is the *Dragonninja;* he is big and nasty, and is likely to have bad breath too. He is also guarded by several other big nasties who you must defeat to get to fight DN. Control of the bad dude is all yours and so are the moves he has to offer. As in all games of this ilk, joystick directions correspond to different actions but generally only three are used.

The screen scrolls horizontally as you move and there is no option to return; when you have waded your way through all the menial ninjas you meet an end-of-level baddie which you must kill to progress. There are seven levels like this, with Dragonninja to defeat at the end. When this is completed the President will buy you a hamburger and you will be on your way – like a good bad dude.

There are various weapons, time bonuses and energy cans to be collected, which makes for a very enjoyable and addictive game. Graphics are very colourful and are very good and it is possibly the best conversion I have seen on the Amstrad.

..the name of the game

Developer: In house
Tape: £9.95
Disc: £14.95

17/20

HIGHWAY PATROL

ADRIAN

Being an elite cop of the future has its advantages – the flashy car, the latest criminal detection equipment and a whacking great gun. Those criminals in the *Dead on Arrival* organisation were in for a shock. The first thing they knew of the latest recruit to the Enforcers was a big red shiny car tearing down the highway with guns blazing. With a top speed of more than 200mph, this was one mean machine and, due to come incredibly sophisticated technology, the speeding knight managed to look as if he was travelling at only 5mph.

Those boys in the good old DOA were not about to stand for this little intrusion, so they set off in their new cars to teach this Enforcer a lesson. It really is a pity nobody told them about the laser cannon.

Apart from the rather slow car movements, this section of the game is well-presented and reasonably enjoyable. As you complete your various missions by killing the villains you receive various extras for your car. They include a well-needed turbo, nuclear bombs which act as smart bombs, and missiles.

Once at the scene of the crime you leave your car and enter the building, armed only with a criminal detector, net thrower and a mega death magnum. As you wander round the deserted building you must continuously be vigilant, as thugs have a nasty habit of sneaking up on you. One thing which struck me as odd was the fact that if you ducked the bad guys could still hit you.

As your search for the master villain, before the timer runs out, you must fend off those thugs armed with axes, whips and machine guns. The magnum makes a fairly neat job of the disposal task but for a little added varierty you can use the net thrower. This device is used for capturing the villains alive and any villain unlucky enough to be caught in a net ends up looking like a frustrated jelly baby. A fast trigger finger is commendable but be careful; occasions the odd innocent bystander is to be found wandering in the buildings.

Once you have located the master villain you must slug it out with your magnum verses his cannon. By jumping over his shots you can survive the encounter, but beware – one hit and you are out and he escapes. After the encounter with the master villain it is back to your car armed with any bonus weaponry you may have collected and on to the next villain.

A little extra speed all round would have improved the game but the graphics are good and there is never a dull moment, as the bad guys in their various forms never cease their assault.



Developer: In house
Tape: £9.95
Disc: £14.95

15/20

Motor Massacre

ADRIAN



When Dr A. Noid set out to conquer the world he did it in style. No mass armies made of robotic zombies for this man; he went straight for the soft parts – food.

Using a secret formula he created one afternoon the doctor found the ultimate addictive – junk food, Slu. With this diabolical formula the doctor dominated the known world and brought it to its knees. As an ex-policeman and member of one of the few Slu free cities you have decided to collect the bounty which resides on the doctor's head.

Bringing your All Terrain Vehicle out of retirement you set forth to battle you way through three heavily-defended cities and on to the final duel with Dr A. Noid. Traversing the cities is no easy task, as the streets are patrolled by the doctor's thugs in their little ramming machines.

They present little or no obstacle to your front-mounted cannon, even if it fires only a single pixel at a time. As a cruise round the streets, carefully avoinding the gun emplacements, you must pay particular vigilance to the building entrances. If you find one which is accessible you can enter the building on foot.

Inside the derelict building you must contend with the mutants which swarm from holes in the ground. Ammunition levels must be watched closely, for it is all too easy to be carried away and finish up the creek without a paddle when the mutants swarm in and you have to rely on some fast manoeuvring.

Extra ammunition, as well as food and car extras, can be found in the buildings. There is one other item to be found – the arena pass. With it you can gain access to the arena where you will be able to fight your way through to the next level.

If things start to run a little short you can always pull into a garage, where you will be able to exchange any food you may have acquired for car repairs and extra ammunition.

The graphics are far from stunning and the sound effects elusive but for all-out wanton destruction, with a little thought thrown in, you cannot go far wrong.

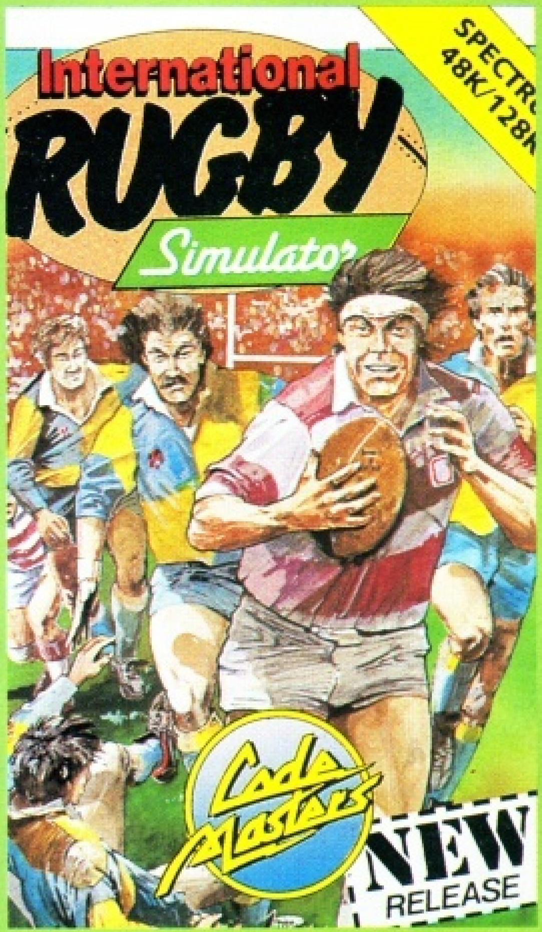
Developer: In house
Cassette: £9.95
Disc: £14.95

7/20

International Rugby

COLIN

Rugger is not so much a sport in this country – more a tradition. It used to command so much respect that players were treated as heros but, alas, like many things today, commercialism has caught up and big money moves – Jonathan Davies from Rugby Union to Rugby League club Widnes for £250,000, for instance – seem likely to become commonplace.



Another note for the selling power of Rugby is the release of the Codemasters *International Rugby Simulator*, which provesthat even an enormously physical sport can be transferred to the home computer and under the obligatory simulator tag, too. What is more amazing is that the format is one in which you take an active part, preferred to the managerial type, which also adds excitement.

The gameplay tries to emulate the sport in every aspect and even the scrummages are there – although a spot of joystick waggling must be undertaken – and can prove very enjoyable. What happens is that you take control of any player on your team at any time – usually the one with the ball – and you must compete against a human or computer opponent who is also playing under the same conditions.

Thenyou must, using great skill, of course, negotiate down the field, using the odd pass to gain maximum effect and score a try. This proves more difficult than one may think.

Even conversions are included and this is done rather ingeniously, with wind direction and strength of kick all contributing factors. Other on-field features are present, like the lines-out, which are very true to life and it all makes for a very realistic simulation.

Off-the-field presentation is also top-class, with up to eight players able to compete at the game in a league tournament and you can even choose the way you wish your team to play – the tactics, in other words. Everything is laid out in easy-to-follow menus so the likelihood of getting lost is very slim. It is always the little things which make a program.

Graphically the game does look not so much like Widnes v. Wigan – more Legoland v. Meccano – but they serve their purpose very well and are fast enough to keep you on your toes. Sound effects, too, is a factor slightly lacking and again has no negative effect towards the game. They do not enhance it but International Rugby Simulator overcomes this with its incredible gameplay.

Rugby is a sport I loved playing while at school and it is one I will now continue, with the aid of Codemasters and an Amstrad. It is well worth the simulator title and the price.

Developer: In house.
Cassette: £1.99

15/20

Munster Mania



PAUL

How many are old enough to remember who lives at 1313 Mockingbird Avenue? If I told you that the TV series has been repeated on Channel 4 recently, would that give the game away? Does the name Herman mean anything to you? You must have heard about the *Munsters*.

That lovable, six-foot, square-headed fellow is back to fight off all manner of ghosties and ghouls in a valiant attempt to save Marilyn, who has been captured by the dreaded Old Nick.

You play the part of a fearless unamed person whose identity would seem to be a very closely-guarded secret, there being no mention of his name. Apart from this ghost-buster being anonymous, he is also very weak, as the slightest touch by a ghost causes him to loose energy at an alarming rate.

What is also worrying is the fact that the instructions are so brief that all you are told is the object of the game and the controls. I apologise – the instructions say "Be careful, watch your energy level; keep your spellpower topped up and collect the mystery objects to take care of the ghouls." Highly informative, I thought.

First, is it possible to gain more energy and, if so, how? Second, what is spellpower? Apart from the illustrations at the top of the screen depicting two bottles, one for energy – this starts full and depletes rapidly as ghosts and ghouls attack – and the other for spellpower which begins empty and remains that way. That is to say I have not yet remained alive for long enough to find how to fill it.

I found the graphics to be of relatively good quality, although they were slightly lacking in colour. The sound effects are not exceptional, although are just sufficient. The music, however, is very catchy and easily compensates for the limited effects.

The gameplay would be satisfactory if you were allowed to play the game for more than five minutes, as your energy is drained so easily. The game will annoy many people and is only one for the most persistent.

Reviewer: Paul Gaunt
Developer: Again Again
Tape: £9.99

7/20

Dynamic Duos

Dynamic Duos used to consist of two characters who were, at the very least, members of the same species. The Lone Ranger and Tonto, Batman and Robin, Starsky and Hutch, Bodie and Doyle, Cagney and Lacey and sundry others testify to this fact. Times and fashions change but I will still need convincing that they have changed so much that the latest offering from Firebird makes any sense. The whizz-kids at Probe have decided that a duck and a dwarf make a lively combination. I bet thay have vodka with their lager and caviar with their coco-pops.

Anyway, we have a duck and a dwarf. This duck and dwarf, besides being a trifle strange, are daring, brave, heroic and the subject of a great deal of gossip. They have decided to enter the Night House, a building full of hidden rooms and treasure chests waiting to be found by someone brave enough, and stupid enough, to look for them. Sounds like my cue.

The house consists of many corridors and secret rooms which have to be explored to find the treasure chests. There are 10 pieces of a key hidden in the chests. The complete key opens the door to the Calculation room. When you have all of the pieces of the key and have managed to open the door to the Calculation room, the game is over.

Dynamic Duo is a one or-two-player game, so you can squabble over who is the duck and who is the dwarf. The duo can stick together, with the duck squatting on the dwarf's head – it is a very trusting dwarf – or they can split. The duck can fly much faster that the dwarf can run, so sometimes it is worthwile separating them. This allows the duck to scout for the chests. The dwarf can follow and open any which the duck finds.

The screen is divided into three parts. The top section shows the playing screen when the two are one, so to speak. The middle section contains a map showing the area covered and any objects or items in that part of the map. This changes into the playing section for player two, however, when the duo split – hello, are you still there?

The bottom screen contains the players' scores and the number of key pieces collected so far. Among those out to obstruct and deter the Dynamic Duo are flying skulls, giant eyeballs and the Grim Reaper. Dear old Grim seems to have undergone a conversion to the Cistercian order because he is dressed in a monk's outfit. He has a tendency to appear unexpectedly and kill your characters. Needless to say, this is hardly a Christian act.

The gameplay is reasonable, although it must be said that it can be puzzling trying to play the one-player game when the duo split. The graphics feature plenty of cheerful, bright colours and the characters look cute. The sound is not. Still, Dynamic Duo is probably a godsend for all duck lovers, because there are not many duck games about.

BILLY





Developer: Probe Software
Tape: £8.99
Disc: £14.99

15/20

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Remember that many word processors only work efficiently if you have a second disc drive. For example, the disc version of Protext needed the disc to be changed eight times to check the spelling of our test file, whereas BrunWord needed no disc in the drive.

BrunWord is supplied with a 40 page manual which has several detailed examples, starting with step by step instructions to produce and print a simple letter. But the very first step is to load the TUTOR file into BrunWord. This takes even the complete novice straight into word processing and demonstrates the powerful editing and formatting features of BrunWord. There are also examples of printer control, showing how to create headings, to underline or to emphasis, and five deliberate spelling errors for you to correct. The tutor takes about 20 minutes to run through and after that you will feel confident to type in your own text.

BrunWord Features

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*Memory resident with word processor *Checks 4,000 words/min *30,000 word dictionary *No American spellings *Add up to 5,000 of your own words *Instant lookup *Helps to find correct spelling *Automatic correction.

DataFile Features

*Alphabetical, numerical, date sorting on any field *User defined headings *Search routine *Data merging into BrunWord *Label printing.

BrunWord Junior £12.95

This is a low cost version of BrunWord 6128 on 3 inch disc and includes the spelling checker with 30,000 word dictionary.

Type in a letter or a short essay, check it for spelling errors, save it to your disc and then print it out.

BrunWord Junior is for the CPC6128 and has all the features of BrunWord and BrunSpell but with two small changes. The text area has been reduced to hold just one page of text (about 600 words) and you cannot save words to the dictionary. It is supplied with a TUTOR file on the disc and an instruction manual.

You can upgrade later to the full BrunWord for just £12.95.

Letters

We receive many letters each month. The following were all received in the three weeks before writing this advertisement.

I am extremely pleased with BrunWord 6128, and will certainly update my copy. May I congratulate you on making such an improvement to an already excellent programme.
Mr S (Gloucestershire)

I am writing to say how much I enjoy using the BrunWord disc. It is easy to use and as I am not a good speller the dictionary is most essential. I dislike writing letters but the disc makes it easy and much more exciting.
Clare (age 12 – Herefordshire)

I wish to upgrade (BrunWord) to Info-Script. May I congratulate you once again on a superb product, without which I would be lost.
Mr L (Nottingham)

I have been using BrunWord for quite a while and like it very much. I have told my friends how good and user friendly it is. Also the speed and ease of commands. I enclose cheque for updating to Info-Script.
Mr G (Scotland)

Info-Script has got to be the best buy for Amstrad 6128 word processing. Keep up the good work.
Mr McQ (Leicester)

Info-Script £46.00

Take the BrunWord disc, replace DataFile with a comprehensive relational database, integrate this into BrunWord and the result is Info-Script.

At its simplest Info-Script is no more complex than DataFile but with the attraction of direct access from the word processor, many new and enhanced facilities and the ability to store at least twice as much data. It is possible to have the database, the word processor, 1000 names and addresses and 6 pages of text all in the memory.

You are typing a letter in BrunWord and need an address. Place an address marker &A where it is need. Go to Info-Script and search for the address, using say, the house name. Press T for Transfer and you are back in BrunWord with the marker replaced by the address.

Info-Script has powerful progressive search facilities, a unique four marker system and it can sort data alphabetically, numerically, date or reverse order. It can add, multiply or divide and any number of fields can be added into a running total, which can be inserted into one of the fields. Records can be related by two different methods, SONs or DAUGHTERs.

The data merging facilities are extensive but the simplest personalised letters require just three markers, &A &N &D. These construct a full address, a full name and insert the date.

Info-Script is easy to start but has the power to keep up with your needs.

Comparisons

We have tested BrunWord 6128, Protext (disc) and Tasword 6128 with the same file of 3366 words.

BrunWord scrolled 40% faster than Protext which in turn scrolled 19% faster than Tasword.

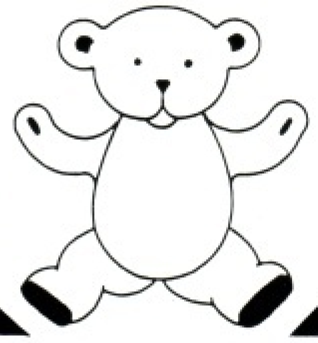
Protext was the fastest to justify but needed a separate operation to see the result. BrunWord produced the best appearance of all three and was 30 times faster than Tasword.

Our simulated typing test reached 218 words per minute. Both BrunWord and Protext had no trouble at this speed but Tasword was very slow inserting text into the start of a paragraph and could only handle 16 words/minute.

The spelling test checked all 3366 words. BrunSpell took 52 seconds and needed no disc changes. Prospell took 6 min 24 sec and needed 8 disc changes. Taspell took 18 min 46 sec and needed 3 disc changes.

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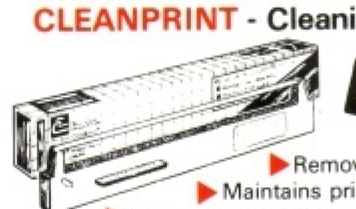
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Adventure Maestro, Tony Bridge, brings his infinite wisdom to Amstrad owners with the aid of 'Times of Lore'.

Adventure

"There was once a time when chaos roamed the land and the common folk abandoned their hope of ever living in a peaceful kingdom again. A time when no High King sat upon the throne of Albareth." So speaks the storyteller, Merideth and Stephan's Grandfather – and these are the Times of Lore. *The game itself is set in the land of Albareth, which is in dire straits and looking for a saviour from the troubles. That savious is, naturally, you . . .*

***TOL** is from the American house Origin Systems, via Microprose. In keeping with the high standard of Microprose packaging, the glossy box is stuffed with playguides, machine-specific technical details and maps along with the single disk. The loading screen is pure magic and well worth sitting down to watch for half an hour or so – a disembodied hand gradually chisels out the title and then fills the lettering with molten silver. At any time, though, you can halt the process and get into the game itself, either starting anew or loading a previously saved game.*



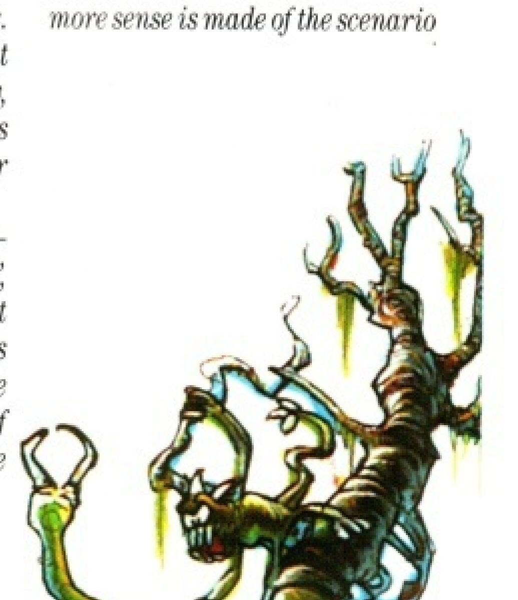
Starting a fresh game will place you in an introductory scene-setting sequence featuring beautifully drawn cameo pictures illustrating the story leading up to the present, and then you choose your character.

I time-honoured RPG fasion, you are able to put aside your humdrum real life and temporarily become a knight, whose armour is excellent protection in battle, a Valkyrie, whose quickness and agility makes up for alck of armour, or a Barbarian whose sheer brute strength is a welcome adjunct to the skimpy loincloth which is the only material protection he has. Computer Magazine Editor is not an option, but then as far as I know, that particular character offers absolutely no protection whatsoever against anything at all.

***TOL** is billed as "a class – Adventure featuring arcade thrills", thus ensuring that just about everyone gets a look in. What is boils down to is a walk-round adventure with plenty of exploration, lots of magic, lots of jabbering to all the characters you meet, lots more walking, and bet of all, lots of Biff-Bang (on, and more walking . . .)*

In fact, walking seems to take up most of your time, but as you'll see later, there are ways round this plodding. You look down on your character as he/she walks around the scrolling landscape with a rather fetching swagger to the hips – the scenery is well-drawn, as are the buildings that you'll come across at certain points. As you enter a building, the roof falls off (well, disappears actually) so that you can see what's happening inside.

These buildings are, for the most part, safe havens from the dangers of the open countryside. You start in the village of Eraian, and more precisely, The Frothing Slosh Tavern. Here you can wander about for a while talking to the customers and the Innkeeper – you can pass the time in idle chit-chat, or ask more pointedly about rumours. As in some of the **Ultima** *adventures (also from Ultima), one question will lead to another and possibly to another and so on, until a little more sense is made of the scenario*





At the same time, you may be given a quest to embark upon and you can buy provisions from the landlord to help you survive the rigours of the tasks ahead. Dotted around the playing-screen are several icons, by which you communicate with the program. Using these icons, you can elect to speak to people, pick up or drop items, use items, get an inventory or enter the

Bridge

save/load/score options. As well as those icons, a large candle flickers at one side of the screen, and this candle of course slowly melts down. Obviously, you must keep a careful eye on the candle, and seek shelter in good time, before it reaches the end of its life (this is also the end of your life). The candle can be refreshed by entering the safety of an Inn (where you can save your progress to disk), or one of the few comfort stations dotted around the landscape. However, beds are limited, and after dark you may find them occupied – it's possible to do in the occupant of the bed, but that might affect your score.

Once away from the safety of friendly buildings, you're at the mercy of any of the monsters and



villains roaming the countryside. You'll meet all the usual things like Ghosts, Orcs, the lovely Slime, Evil Clerics, (but strangely, no magazine editors – that's going a bit far, I suppose). Combat is a simple process – just move adjacent to the required victim and jab away at the fire button, bearing in mind the fact that the enemy may be throwinggs at you at the same time. Your weapon (please excuse the phrase) will thrust forward (ditto) quite neatly and eventually lay waste to the enemy.

At first, as your candle burns brightly, you will leave the land scattered with the bodies of the vanquished, but as it gets lower and lower, combat is more costly until eventually, you'll find that even



swatting an Albarethian fly will seal your doom. But it's well worth all the trouble – first of all, there's a neat little animated sequence of the vanquished for crumbling to a pile of bones and then a well-decorated tombstone. Second, your score goes up by (at least) 10 points with each unsuspecting victim. And occasionally the bones will reveal a nice phial of magic potion or a scroll bearing a worthwhile spell.

Walking around is extremely boring – keeping the joystick pressed in the direction of travel gets very tiring, and watching your character sashaying around is even more so. Again like Ultima, villages and towns are dotted around the countryside and each one needs to be visited in order to gain knowledge and pick up titbits of information from the other characters, so travel is necessary. But there is a pair of magic boots to be had at a certain location, and a magic scroll allows instant transportation to a village of your choice, though unfortunately only twice.

The whole program is managed with typical Origin flair and although the "arcade thrills" aren't going to raise a sweat on anyone's brow, the adventuring is enough to keep most of us slogging away for quite some time.

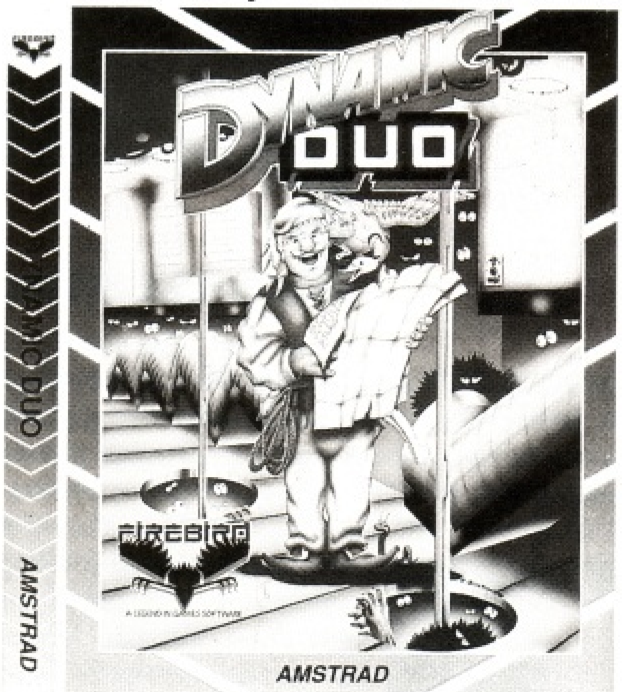






WIN! COMPETITION WIN! WIN!

AMSTRAD Computer User in conjunction with Firebird Software, is offering readers the chance to win one of 30 copies of the Firebird Dynamic Duo.



Dynamic Duo features something with which we pride ourselves at Focus — teamwork. Firebird has used teamwork as the theme for its latest game, in which you play the part of a rather weird-looking fellow and a duck. Read the review in this month's games pages for the whole story.

So what do you have to do? Easy. Just complete the following three Dynamic Duo phrases, and fill in the tie-breaker line, in not more than 10 words. Then, just post it. Nothing could be easier.

The winners will be the 30 readers, in the editor's view, who answer the three questions correctly and complete the tie-breaker in the most original, funny and apt way.

Complete the following Dynamic Duos:-

(1) Batman and ....

(2) Laurel and ....

(3) Starsky and ....

If I could be in a Dynamic Duo, I would like to be half of ....
.... because ....
....
(in not more than 10 words).

Name .... Address ....
....

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PROGRAMMING IS JUST A GAME

Auntie John gives away those game design secrets.

Now we have spent the last few months looking at the basics of machine code programming on the Amstrad CPCs it is time we got down to doing something useful.

You will no doubt recall that we have looked at reading the keyboard, writing to the screen, printing numbers and making sounds. That seems like everything you could possibly need to write a game in machine code. Anyway, using all the routines we developed we have sufficient information to write a simple arcade game.

When I mention something like The module called PRINT-A-NUMBER I mean a piece of assembly language we have looked at previously: Now we reach the first major problem. What game are you to write? That is where the more optimistic programmers will say three dimensional programmers will say three dimensional Zombie attack from alternative galaxies with Hardware scrolling and the more realistic will mutter something like "What about a game of squash?".

SQUASH!

Having decided on a really simple game such as squash, its time to telephone several of the biggest software companies and get some contracts to sign. Perhaps not. After spending ages writing your first game you will even be able to get granny to play it. First games are always dull. Do not be discouraged – everyone has to write first games. One of my first was written on a ZX-81 and was so dull that it put everyone who saw it into a two-week coma. Those who are too young to remember the ZX-81 era may count themselves lucky; older folk will sigh with nostalgia and remember long nights huddled round the little black box for warmth, waiting for the game to load.

The first game you will write will be terrible. It will take a long time to produce, it will crash, and will hold the attention of anything with a higher IQ of a house-brick for less than 10 seconds – but it will be your game.

Your second game will be better and the third better still. By the fourth? Well, perhaps time to think of setting up your own software house? Do not be disheartened; just realise that things will get better, easier and more commercially feasible with time.

We now come to the wonderful task of designing the game. I know you all want to roll up your sleeves and start hammering away at the keyboard but that way leads to messy programming, millions of bugs and probable madness. Unfortunately, it is time for a large piece of paper, a trustworthy Biro and perhaps even one of these little plastic flowchart template things stationery shops stock.

There are as many ways of designing a program as there are ways of coding it. It is for you to decide what style of design you will use, whether it is top-down, bottom-up, middle-out or some other way. Top-down involves starting at the highest level of the program and working down until you reach the really nitty-gritty stuff. It has the advantage that your program will be beautifully-structured and easy to de-bug.

With bottom-up design you start at some tiny piece of code, say a scrolling routine or a way of printing an object, and write more and more complicated code until you have finished. The advantage is that you do not write an entire game before you realise that you will not be able to scroll something fast enough, or for some other reason the game is impossible to write.

Middle-out is a term I conjured on the spur of the moment but it describes the way in which I program very well. It is a kind of cross between top-down and bottom-up.

If you ever get a job as a commercial programmer – programming mini and mainframe computers for a living – you will be compelled to use a design methodology and when using it you must plan your program in a pre-defined order, keeping detailed notes about averything. Design is a very important aspect of programming, so remember not to treat it too lightly. That should not deter you from doing little drawings; a good design is one someone who has not seen a computer previously will understand.

```
Set Variables

Set Screen
```

Figure 1. Overall design for Squash

Se we have a large sheet of paper and a pen. For our game design let us use top-down approach, to get the overall structure correct. If we are writing a simple squash game – bat hits ball hits wall – it would look a little like figure one.

Coding

Now we can add more detail. Figure two has expanded on the first few parts of figure one. Notice that we have not even mentioned switching on the computer yet.

It is at that time we can think about coding. Is there part of the design which looks a little tricky? How about moving the ball? Well, try and expand that even further, such as in figure three. You can continue in this way until you have written the entire program in a form both easily understood by you and, at the same time, is almost machine code. This is known as step-wise refinement.

Now you can switch on the computer and start entering the code. Use plenty of calls to subroutines and modules and plenty of comments, as in figure four. The subroutines called in figure four can be written later and each of them may themselves call other subroutines.

Notice how 'flag' is used to store the current game status. If the bat failed to hit the ball, 'flag' would be set to a non-zero value – say 1. An Escape key option is also a good idea; somewhere in the main loop a piece of code checks for key number 66 being pressed and sets flag to another non-zero value – e.g. 2. Thus when the program exists its main loop 'flag' can be examined to see what is happening.

Some may be wondering how to use variables in

Figure 2. Some of figure one in more detail.

```
                    Set Variables

Set SCORE to zero   SetLIVEs to three   Set initial BAT and
BALL positions.

                    Set Screen

Choose MODE         Choose INKS         Print SCORE and LIVES
                                        using the PRINT-A-
                                        NUMBER MODULE
```

Figure 3. Move ball in more and more detail.

```
Move Ball

        Erase old Ball
```

Figure 2. Some of figure one in more detail.

```
;Squash Game (c) Me 1989
        org &4000               ;Start address of code.
        call Set_Variables      ;Routine to initialize SCORE etc
        call Set_Screen         ;Routine to set MODE and stuff
LOOP
        call Move_Bat           ;Print and move the Bat
        call Move_Ball          ;Print and move the Ball
        ld a,(FLAG)             ;FLAG is a variable that is zero
        cp 0                    ;if the game is continuing normally
        jp nz,LOOP              ;but if something happens, it is
                                ;set to a non-zero value.
        ret                     ;RETurn to BASIC.
```

Figure 4. Coding the game.

```
        org &4000               ;Start of code
        call set_variables      ;A subroutine to initialize variable
                                ;values
        call print_score        ;A subroutine that prints the score

        jp loop

;Subroutines

        ld hl,(score)
        call PRINT_A_NUM        ;Our previously defined code module.
        ret

        ld hl,0
        ld (score),hl
        ret

;variable storage space
```

Figure 5. Variables in machine code.

machine code in the same way they are used in basic. Nothing could be simpler; variables are just a few bytes of memory set aside with a label telling you where you are. Let us look at a small piece a program which sets up a variable to keep the score – figure five. The assembler you are using may be more fussy about what you can and cannot define as a label, so check the instructions if you are in doubt. The variable 'score' is defined to be two-bytes long, which means it can store values from 0 to 65535. If 'score' was defined to by only one byte long – using the DB, define byte, pseudo-op instead of DW, define word – the A register would be used to set its value, not the HL pair.

After two days you should have finished typing in your game and be in a position to test it. If you have used modules you have coded and tested previously; things will be much easier than if you wrote the code specially for this program. Testing will also be easier if you have a Monitor program; it allows you to stop the program at any point and print-out the contents of the registers.

You will notice that I have give you no code to type-in; you will have to work out that yourself. When you get the simple game working, why not try adding extra features? Sound is easy if you remember to read the article I wrote about it. You could change the game into a version of *Breakout* or *Arknoid* or even something different.

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That alone would have satisfied many people, but Romantic Robot has gone one step further, incorporating a memory editor. No program is safe with this: everything is out in the open, including the Z80 registers, CRTC data and any part of memory.

Don't be fooled into thinking this will result in mass piracy, however. The *Multiface* unit itself must be plugged into your Amstrad to allow reloading of a program it saved.

Multiface II must be the cleverest hardware device at present - a necessity for disk owners who thought they were stuck with loading from tape every time.

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I AM a newcomer to the Amstrad, but I have already got warriors on two different computers. I have been looking for the pokes to the Amstrad CPC 464, since having it but, as yet, am without luck finding any.

Could you advise me where I can find them?

Simon Kershaw
Shoeburyness, Essex.

ED: Unfortunately we cannot help. The only option would be to wade through old copies of ACU or write to a sister publication, *Computer Gamesweek*, at the same address.

PLEASE could you print a memory-map for the CPC 464. I wish to start programming in machine code, and I find the map in the manual a little sketchy.

I would like to know where the O.S., the Basic, user RAM, the screen memory, and the input/output sections of memory are located.

Steve Hirschorn,
Isleworth, Middlesex.

ED: Unfortunately there was no space in this month's letters page for a diagram. Your letter will be answered in next months Programmers' Surgery.

I USED to read CPC computing . I have just bought the newly merged magazine. I am very disappointed that there are no 10-Liners.

Please will you bring them back in future issues?

James Watts,
Horsham, West Sussex.

ED: The 10-Liners are back and staying.

IN the February 1987, edition of *Amstrad Computer User*, there were several programs for PCs by Kevin Freeman. I typed *Sniper* which was great. Before that I set my sights at typing 'Combat'.

When run, the computer spotted an error (a type mismatch) in line 1370. In the end, all I got from of the program was a flashing border and the message "Combat. Please wait. . .Type Mismatch in 1370".

I checked through the program again and again. Could you help me?.

James Thompson,
Wellingborough, Northamptonshire.

ED: A plea to other readers on this problem. If anyone has a working copy of Combat, please send it and we will forward it.

I AM comparatively new to programming and I am having one or two problems. First, how do you get more than one colour on a defined symbol? Second, how do you get symbols to use data? I have tried all kinds for both of these without success, hope you can help.

Ben Newhouse-Smith
Liverpool.

ED: The easiest way to get more than one colour on a symbol, assuming you are programming in Basic, is to overlay two colour symbols using the exclusive (XOR) mode. Getting symbols to use data will also be covered by the memory map in next month's Programmers' Surgery.

THIS is a two-pronged letter, (a) a very bitter complaint and (b) a plea from the heart.

Just after Christmas I bought Maxam on ROM, and *Programming the Z80* by Zaks, with the intention of trying to learn to program in machine code.

Having experimented with the assembler and started on the book, I dug out my old copies of ACU for some of the machine code routines to type in and try.

The one thing I kept reading was that a firmware manual was essential, so my local computer shop to buy the 6128 firmware specification. It had been unable to obtain one for some time.

So the Yellow Pages wasre thumbed through and nearly every computer shop in the area was tried, all with the same answer, "We can't get it!!" Then I tried bookshops, you can guess the answer. Then I tried the mail order firms who advertise in your pages; still no joy.

What I had learned by now, though ringing the user club, was that it had been deleted at the beginning of December 'because there was no demand for it.' If there is no demand for it why is there not a single copy of it collecting dust on some computer or book shop shelf for me to buy? Especially when it is only been out of print for about two months.

Now the whole point of my letter. Where can I get hold of a copy of the 6128 firmware specification? or, as I'm beginning to think, have I wasted nearly £60 buying an assembler for a computer which is about to be deleted?

R.J.D. Hartley,
Wirral, Merseyside.

ED: This is yet another which will go to Programmers' Surgery. Read the Pyradev manual very carefully – it seems you must have missed something.

Send your letters to
Lance Davies
Letters Editor
Amstrad Computer User
169 Kings Road, Brentwood
Essex CM14 4EF

10 LINERS

Send your 10 Liners to: Amstrad Computer User, 3rd Floor, Greencoat House, Francis Street, London SW1P 1DG. Remember to include a suitably stamped, self-addressed envelope if you want us to return your tape or disc.

Solitaire by Vincent D'Haeyere

```
[13]   10 GOSUB 90:FOR i=1 TO 9:LOCATE
          i+1,1:PRINT CHR$(48+i);:LOCATE 1
          ,i+1:PRINT CHR$(48+i);:NEXT:SYMB
          OL AFTER 231:DATA 222111222,2221
          11222,222111222,111111111,111101
          111,111111111,222111222,22211122
          2,222111222:SYMBOL 232,0,0,0,0,0
          ,0,0,0
[82]   20 DIM a(9,9):FOR i=1 TO 9:READ a$:
          FOR j=1 TO 9:LOCATE j+1,i+1:
          PRINT CHR$(230+VAL(MID$(a$,j,1)));:
          a(j,i)=VAL(MID$(a$,j,1)):NEXT j,i
[DA]   30 GOSUB 100:LOCATE 1,15:CLS #1:
          INPUT #1,"L,R of departure : ",ld
          ,cd:IF a(ld,cd)<>1 THEN 30 ELSE
          LOCATE 1,16:CLS #1:INPUT #1,"L,R
          of arrival : ",la,ca:IF a(la,ca)
          <>0 THEN 30
[2E]   40 IF ABS(ld-la)<>0 AND ABS(ld-l
          a)<>2 THEN 30 ELSE IF ABS(cd-ca)
          <>0 AND ABS(cd-ca)<>2 THEN 30
[6B]   50 IF ld=la THEN le=ld ELSE IF l
          d>la THEN le=ld-1 ELSE le=ld+1
[ED]   60 IF cd=ca THEN ce=cd ELSE IF c
          d>ca THEN ce=cd-1 ELSE ce=cd+1
[6D]   70 a(la,ca)=1:a(ld,cd)=0:c=c+1:L
          OCATE ca+1,la+1:PRINT CHR$(231):
          LOCATE cd+1,ld+1:PRINT CHR$(230)
[CF]   80 a(le,ce)=0:LOCATE ce+1,le+1:P
          RINT CHR$(230):CLS #2:PRINT #2,"
          Left :";44-c:IF c=43 THEN PRINT
          #1,"You have won !":CALL &BB18:RU
          N ELSE 30
[11]   90 MODE 1:PLOT 0,0:DRAWR 639,0:D
          RAWR 0,399:DRAWR -639,0:DRAWR 0,
          -399:LOCATE 16,2:PRINT"SOLITAIRE"
          :WINDOW #1,2,39,24,24:WINDOW #2,
          2,20,20,20:PAPER #1,3:PEN #1,1:W
          INDOW 15,39,5,15:RETURN
[98]  100 PRINT #1,"<TAB> ... Quit - A
          nother key to go on.";:CALL &BB1
          8:IF INKEY(68)=0 THEN PRINT #1,"
          You've lost, have another go !":
          FOR i=1 TO 3000:NEXT:RUN ELSE RE
          TURN
```

The classic board games in 10 lines!!

3D Cone by David Hall

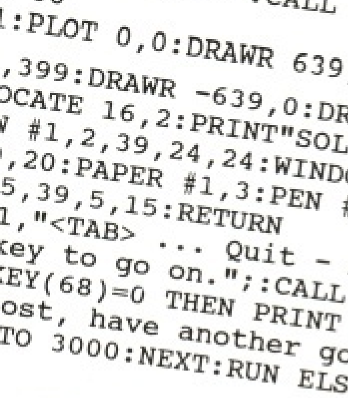
```
[2B]   10 MODE 2:PAPER 0:CLS:INK 0,0
[E2]   20 e=61:s=193:FOR a=0 TO e STEP 2
[E7]   30 FOR v=0 TO s
[FB]   40 PLOT 70+2*(v+a+1),400-2*(a+11
          9-((SIN(a/e*2*PI-PI/2)+1)*(SIN(v
          /s*2*PI-PI/2)+1)*30)),1
[7A]   50 NEXT:NEXT
[20]   60 INK 1,RND*27:FOR j=1 TO 1000:
          NEXT:GOTO 60
```

Enter a new dimension!!

Sound Effects by David Hall

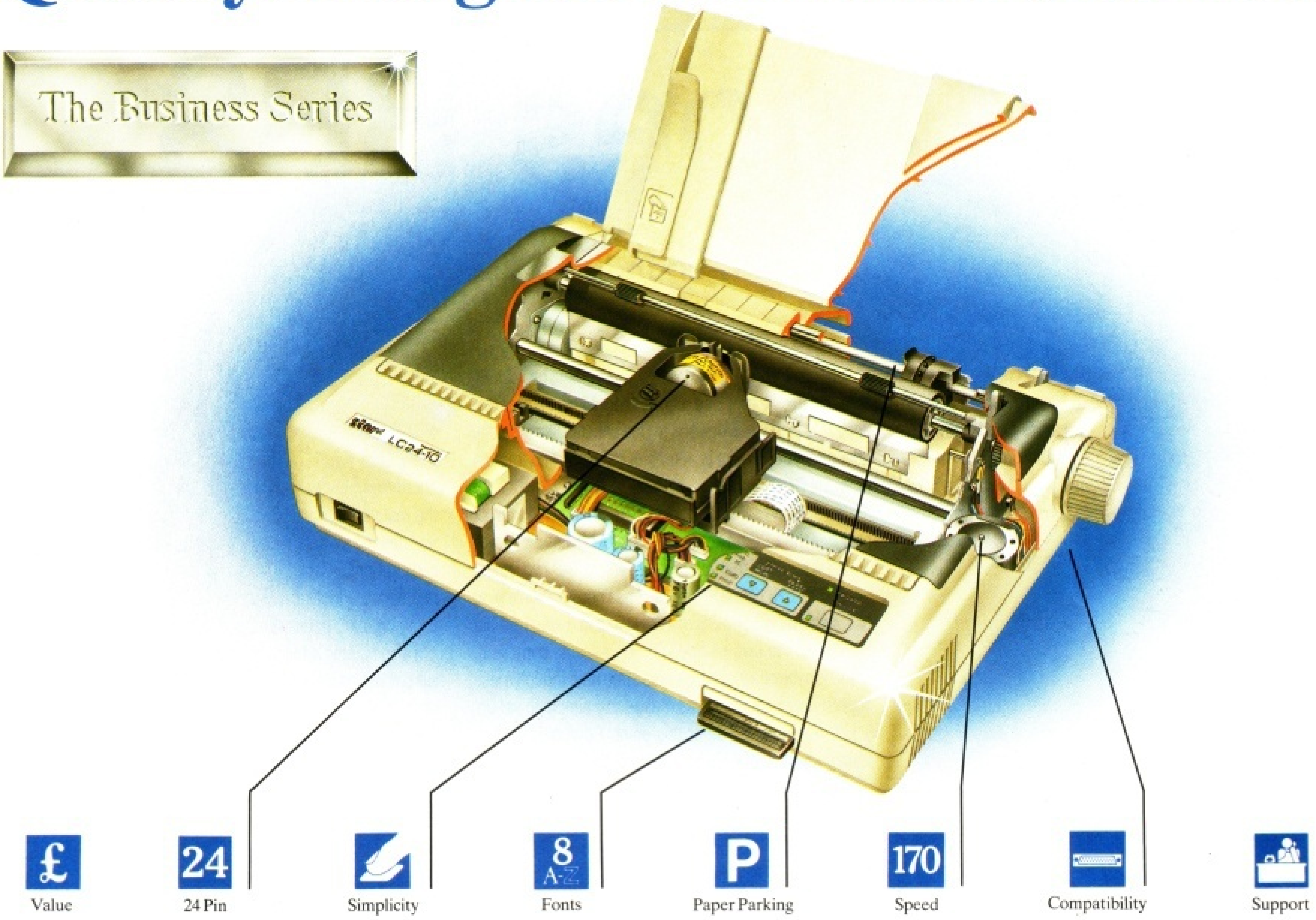
```
[62]   10 PAPER 0:CLS:MODE 1:PEN 3:PRIN
          T "      *** Sound Effects (DEMO)
          ***":LOCATE 1,24:PRINT " ++++ PR
          ESS 'SPACE' FOR NEXT SOUND ++++"
          :LOCATE 1,7
[42]   20 PEN 2:PRINT "1... A cute litt
          le birdy.":WHILE INKEY$<>" ":FOR
          h=1 TO RND*100:NEXT:FOR t=1 TO
          20:SOUND 1,t,1,15:NEXT:WEND:WHIL
          E INKEY$=" ":WEND
[D4]   30 PRINT:PRINT "2... Look out he
          re come the cops!":WHILE INKEY$<
          >" ":FOR t=90 TO 60 STEP-1:SOUND
          1,t,3,15:NEXT:FOR t=60 TO 90:SO
          UND 1,t,3,15:NEXT:WEND:WHILE INK
          EY$=" ":WEND
[72]   40 PRINT:PRINT "3... Don't Push
          Me !!!":WHILE INKEY$<>" ":FOR t=
          50 TO 130:SOUND 1,t,1,15:NEXT:FO
          R l=15 TO 0 STEP -1:FOR t=1 TO 1
          5:SOUND 1,0,2,1,0,0,t:NEXT:NEXT:
          FOR g=1 TO 100:NEXT:WEND:WHILE I
          NKEY$=" ":WEND
[E8]   50 PRINT:PRINT "4... Oh do shut
          up R2-D2 !!":WHILE INKEY$<>" ":a
          =(RND*20)+5:SOUND 1,a,2,15:SOUND
          2,a+1,2,15:WEND:WHILE INKEY$="
          ":WEND
[19]   60 PRINT:PRINT "5... Scary sound
          s (gulp !!)":WHILE INKEY$<>" ":S
          OUND 1,1000+RND*600,100,15:SOUND
          2,1000+RND*600,100,15:WEND:WHIL
          E INKEY$=" ":WEND
[87]   70 PEN 1:LOCATE 10,20:PRINT "THA
          T'S ALL FOLKS !!":WHILE INKEY$<>
          " ":WEND:WHILE INKEY$=" ":WEND:R
          UN
```

David's stunning sound effects.



The figures in the left hand column of the listings on this page show they have been checksummed by **ACU Proofreader**, the real-time type-in tester published in the January 1989 issue of *Amstrad Computer User*. You don't need **ACU Proofreader** to be able to run this listing, but having it makes spotting typing errors very easy.

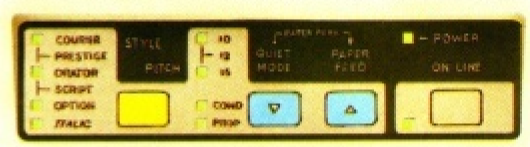
Quality. Designed from the inside out.



For state-of-the-art printing the multi-font LC24-10 gives you value for money as well as the superior quality of a 24-pin printhead.

The LC24-10 is compatible with almost every computer's needs whatever the system. It can emulate most industry standards with ease, a standard feature that we think should always be included. For connection over longer distances, there is even the option of a low-cost serial converter.

Putting the LC24-10 to work couldn't be simpler. At the mere touch of a button on the front control panel you can choose any one of eight resident letter quality fonts, determine your



pitch size or simply put the paper park into action. (No more inconvenient DIP switches to hamper you). As with all our printers, it offers both double and quad height print for striking headers.

170 From 0-170 characters in one second and that's just the elite draft. The LC24-10 will also perform word perfectly at a rapid 57 cps producing exceptional letter quality for pristine correspondence and important documents. And while you print, the 7K text buffer frees you and your PC to get on with other things.

£ No other 24-pin printer in this price range can match it. Features like its generous text buffer, expandable to 39K, built-in push tractor and revolutionary continuous paper parking facility are all included as standard. Another impressive feature you won't find as an optional extra is the LC24-10's versatile range of print variations. All fonts come with the option of shadow, outline and even shadowed outline to turn all text into works of art.

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CPC goes BBS

Running a Bulletin board on a CPC sounds impossible. Malcolm Arnold, our intrepid explorer, tells you how.

Set up a bulletin board on a CPC? You must be joking. In August, 1988, having bought a more exspensive auto-answer, auto-baud scanning modem specifically with that project in mind, I was starting to pick up bad vibes. If you owned a BBC or a PC, apparently, you had to avoid drowning in the deluge of possibilities in terms of available software – a 6128?

Not always easiest

In desperation I put out an SOS on the Cage, the Micronet Amstrad area. Within two days Andy Keeley Mbxed me with the offer of his viewdata software, currently running as Julian Sinclair's Cynotel. I thanked him but I had really set my heart on a scrolling board.

My lonely on-line search continued from board to board – "BB sox for a CPC? I know a board running on a ZX-81 somewhere" – until one night it seemed as if a new star appeared in the heavens and my life became like a Bounty advertisement. I went in search of paradise and found it in Infotel ROS.

There the sysop, Mohamed Salleh, infomred me that not only was the CPC an adequate BB host but I had a choice of software. At that juncture there were two major possibilities, ROS and XRAS. ROS has become something of a standard among BB software – and it was free but Salleh told me I would need Turbo Pascal to compile it. XRAS, on the other hand, was also free and, though a less sophisticated option, it was reasonably simple to set up.

Let me quote at you at this point. Confucius he say, "Simple way is not always easiest." Or, more precisely, "XRAS has sufficient bugs to qualify for Rentokil." After some weeks of Salleh talking me through patching and overlaying, frustration and sleeplessness, even he decided to call it quits. His reasoning? If the software author was unwilling to support his brainchild – he was not – why should Salleh run himself into the ground in the process?

So what next? The mysteries of Turbo Pascal? No, another contender had arrived on the scene. Salleh, ever the matchmaker, introduced me to Blane Bramble, who was nearing a creative crescendo with a new bulletin board package for CPCs and PCWs. Named BullDog, a sideways reference to FidoNet, it cost £25 and could be put together using ordinary public domain CPM utilities.

It also had the added bonus of having an author who is still committed to the development of the software. Not only were new on-line features in the pipeline but direct technical support was just a telephone call away.

I knew where to find the software, and I already had the modem – a Pace Linnet intelligent V21/V23 model. What else did I need? More storage capacity. Even stripped to essential files, the BullDog system would leave me only something like 20-30k on my internal drive. I needed a second drive.

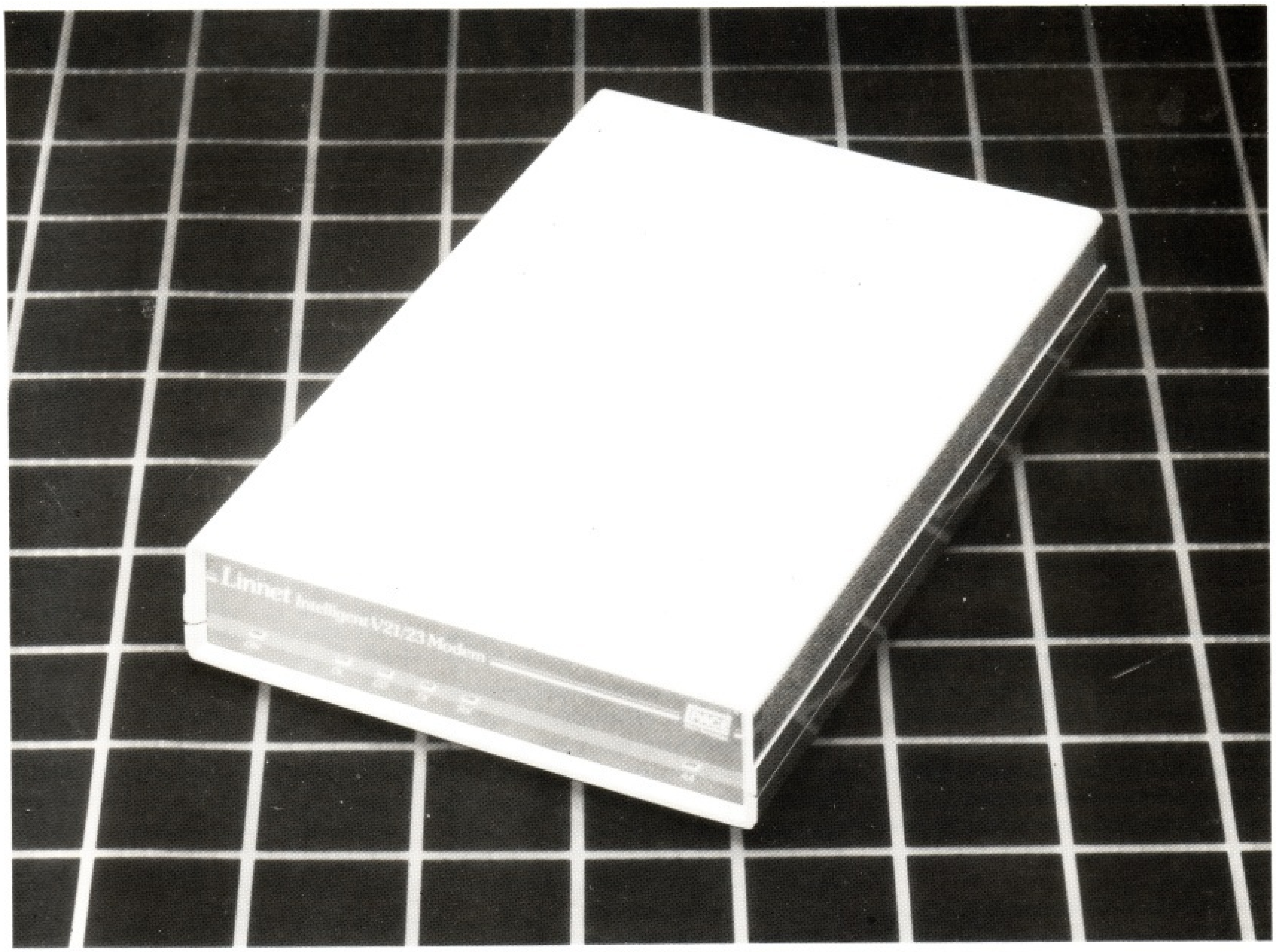
Direct technical support

Initial enquiries to retail outlets in my vicinity offered the Amstrad 3in. job as the only possibility. It would merely have doubled my storage capacity, which would not have been nearly enough. More ferreting paid off with the KDS 5.25in. drive which gives just under 800K under RAMDOS, which is with it on disc. Phil Craven's review of the Siren 3.5in. drive in the February issue provides yet another option.

So the BullDog duly arrived on a 3in. disc, complete with a detailed sysop's manual. The disc was in PCW format but an on-line jaunt to the Winchester Remote extensive CPM files area provided me with a utility called FORM3, which enabled me to copy the system files to the 5.25in. drive, translating them into CPC-readables in the process.

A front-end was provided specifically for the Linnet, plus other optional fronts for WS4000 and Pace Series 4 modems. Assembling relevant files was done easily, with





Pace Linnet V21/V23 modem.

helpful step-by-step instructions. An idiot-proof configuration program enabled the setting-up of bulletin textfiles, special-interest message areas and file areas.

Soon the day arrived when, preparations complete, my new-born board went on-line. I waited for a test call from friends. Everything worked except Confucius he also say, "CPC owner setting up BB with Linnet had better check ROM version number."

Idiot-proof configuration

Access at 1,200/75 baud was random to say the least. Another week or so of tinkering up, with the front-end came to nought. Then fellow CPC sysops Ian Potts and Keith Pomfret gave the wink. The old version 2 ROM was patently unsuitable for auto-baud scanning under much BB software. Pace agreed with that diagnosis and exchanged my chip for the new version 3. Access at both V21 and V23 became smooth – all systems go.

If you are considering setting up on a 6128 – do not forget you will probably have to put your life on hold for at least a month to do so – take comfort in the fact that you are not alone. Infotel is off-line at present, sadly, but when the going gets tough here are some other numbers to call:

Frozen Wastes
– 0524 841021 – V21/23 – 24hrs
(Sysop Keith Pomfret, co-sysop Ian Potts)

King Of The Castle
– 0233 620228 – V21/23
Mon-Thurs 2000-0645, Fri 2000-1200,
Sat 1800-1200, Sun 1800-0645
(Sysop Chris King)

Aspect
– 061 792 0260 – V21/23 – 24hrs
(Sysop Dave Gorski)

Winchester Remote
– 0962 69322 – V21/22/22bis/23 –
24hrs
(sysop Mike Fudge)

Midget GEM
– 0748 834836 – 24hrs
(Sysop John Laffey)

The Owl Service
– 0532 605876 – V21/23
Fri & Sat 2100-1400,
Sun-Thurs 2300-0800
(Sysop Malcolm Arnold)

CPC BB Checklist

1. Auto-answer/auto-baud scan modem, e.g., Pace Linnet (Pace – 0274 488211) or Miracom WS4000. Miracom is offering half-price modems to genuine sysops. Contact it via Nestor (0635 523811).

2. RS232 interface to connect modem to computer.

3. Suitable BB software. Contact the boards listed for advice on Scrolling software; Blane Bramble (01-272 0539) for BullDog or Andy Keeley for viewdata (Prestel MBX 323647004).

4. A suitable telephone line/socket. A second domestic line costs about £115 to install if you do not want to tie up your voice line.

5. A second disc drive giving at least 700K, e.g., KDS 5.25in. at around £150 (KDS – 0485 32076) or the Siren 3.5in. at around £125 (Siren – 061 228 1831).

6. Patience, blood, sweat and tears.

PROGRAMMERS SURGERY

Jeff Walker gives you the bricks and mortar to build the fill routine which the 6128 has and the 464 should have.

There are jets of steam emanating from a bedroom in a house at Wardley, a small town near Gateshead, Tyne and Wear. The bedroom is the one in which Gary Burns sleeps, although at this moment he is not sleeping – he is sweating over a Basic graphics package he is writing, trying to get the damn fill routine to work.

He has borrowed a routine from a magazine type-in and is trying to adjust it so it will flood complex shapes with solid or patterned fills.

I have studied the fill routine he has borrowed and he is trying to make a silk purse out of a sow's ear – throw it away and start again.

The main problem with programming a paint routine is that the more you want from it the longer and more complex the routine will become. These problems become even more pronounced when using such a slow language as Basic – but it can be done.

Most type-ins I have seen used the common, run-of-the-mill unintelligent area fill and this is what listing 1a does. Tap in the routine and run it – after saving it – and you will see that it fills the hexagon with one solid colour. The fill xxxx works by moving up and down from a pre-defined starting point in the area to be filled. I have set the starting point in line 3000, [I]newx=x:newy=y+2[N]. In a full-blooded art program the start position for the fill would be provided by the user.

On each screen line the routine plot from the starting point to a left-hand and right-hand vertical boundary. If thre is no vertical boundary it plots to the edge of the screen. This continues until a horizontal boundary is found.

A step forward from this primitive technique would be the ability to fill the area with a pattern instead of a single colour would let you create various shades of colour using stipple patterns.

To accomplish this patterned effect it is necesary for the routine to have access to a pattern. The easiest way of doing this is to provide the pattern data in the form of a look-up table, a table of data which the routine can access quickly to find the information it needs to run correctly – a little like you looking at a timetable at a bus stop to see what time the bus is scheduled to arrive.

To see the patterned fill routine in action, add listing 1b to listing 1a and run it.

Note that some lines in listing 1b, replace existing lines in listing 1a.

The adjusted routine starts as normal but when plotting point it looks up what the colour of the point should be from the look-up table. The disadvantages of this fill routine is that it may take many attempts to fill a complex shape. Ths problem can be overcome using the intelligent fill, one which will do the job in one go.

Listing 2a can readily fill any complex area, fairly quickly for Basic, in a solid colour. Add listing 2b and you will find it takes a very lone time to complete a patterned fill. This is because the routine is looking on the screen for the points which are Ink 0 and then plotting over them with the appropriate colour from the look-up table. Unfortunately, if the pattern also includes Ink 0, the routine as it stands will try to fill a pattern with a pattern with a pattern with a pattern ... It is called an infinite loop – or a bug.

There are two methods to overcome this feature but both mean you lose in some way. The first technique is never to use Ink 0 in a pattern, which is not very user-friendly. The second method is to change the colour of one of the other inks to be the same as the background colour and use that ink number in the look-up table where you want background colour to show through the pattern. This means that one routine cannot be used in Mode 2.

For Mode 0 you would encode the colours in the look-up table by using the hexadecimal equivalent of the ink numbers 0 through 15.

If an area of the pattern is to be plotted in Ink 14, that part of the pattern would be made up of a block of letter Es.

The patterns can be any size, up to about 48 x 48 pixels. Change the variables [I]pixacross[N] and [I]pixdown[N] in line 2000 to the width and height dimensions of your pattern.

I know it runs very slowly but it works well and it is the fastest way I know to do it from Basic. What we need is Clever Trevor from wherever to convert the fill routine is listing 11 onto fast machine code which really is not as difficult as it sounds.

If you have a programming problem you would like to tackle, write to him at: Programmers' Surgery, Amstrad Computer User, Greencoat House, Francis Street, London, SW1P 1DG. We regret that he cannot answer queries personally, so please do not send stamped addressed enveloped.

```
10 MODE 1:screenmode=2
11 '
12 ' For mode 0, screenmode=4
13 ' For mode 2, screenmode=1
14 '
20 BORDER 2:INK 0,2:INK 1,26:INK
   2,0:INK 3,15
30 x=320:y=200
40 GOSUB 1000
50 '
60 GOSUB 3000
70 END
997 '
998 ' Draw an area to be filled.
999 '
1000 DEG
1010 FOR i=0 to 360 STEP 45
1020 PLOT 320+100*SIN(i),200+75*
     COS(i),2:i=i+45
1030 DRAW 320+100*SIN(i),200+75*
     COS(i),2:i=i+45
1040 NEXT i
1050 RETURN
2997 '
2998 ' The fill routine.
2999 '
3000 newx=x:newy=y+2
3010 WHILE TEST(newx,newy)=0 AND
     newy<398
3020 GOSUB 4000
3030 newx=x-1*screenmode
3040 GOSUB 4500
3050 newy=newy+2:newx=x
3060 WEND
3070 newx=x:newy=y
3080 WHILE TEST(newx,newy)=0
     AND newy>0
3090 GOSUB 4000
3100 newx=x-1*screenmode
3110 GOSUB 4500
3120 newy=newy-2:newx=x
3130 WEND
3140 RETURN
3997 '
3998 'Find the right-hand boundary.
3999 '
4000 WHILE TEST(newx,newy)=0 AND
     newx<638
4010 GOSUB 5000
4020 PLOT newx,newy,colour
4030 newx=newx+1*screenmode
4040 WEND
4050 RETURN
4497 '
4498 'Find the left-hand boundary.
4499 '
4500 WHILE TEST(newx,newy)=0 AND
     newx>0
4510 GOSUB 5000
4520 PLOT newx,newy,colour
4530 newx=newy-1*screenmode
4540 WEND
4550 RETURN
4997 '
4998 ' Set the colour to plot
     the pixel.
4999 '
5000 colour=1:RETURN
```

```
70 GOSUB 2000
1997 '
1998 ' The look-up table.
1999 '
2000 pixacross=8
2010 pixdown=8
2020 DIM table$(pixdown)
2030 FOR loop=0 TO pixdown-1
2040 READ table$(loop)
2050 NEXT loop
2060 RETURN
2070 '
2080 DATA 22222222
2090 DATA 11111112
2100 DATA 11111112
2110 DATA 11111112
2120 DATA 22222222
2130 DATA 33323333
2140 DATA 33323333
2150 DATA 33323333
3997 '
3998 ' Set the colour to plot the pixel.
3999 '
4000 x1=(xs MOD screenmode*pixacross)/screenmode
4010 y1=pixdown-1-(ys MOD (pixdown*2))/2
4020 colour=VAL("&"+MID$(table$(y1),x1+1,1))
4030 RETURN
```

```
50 GOSUB 2000
1997 '
1998 ' The look-up table.
1999 '
2000 pixacross=8
2010 pixdown=8
2020 DIM table$(pixdown)
2030 FOR loop=0 TO pixdown-1
2040 READ table$(loop)
2050 NEXT loop
2060 RETURN
2070 '
2071 ' This data creates a brick type
2072 ' pattern with alternate rows of
2073 ' white (ink 1) and orange (ink 3)
2074 ' bricks with black (ink 2) cement
2075 ' between them.
2076 '
2080 DATA 22222222
2090 DATA 11111112
2100 DATA 11111112
2110 DATA 11111112
2120 DATA 22222222
2130 DATA 33323333
2140 DATA 33323333
2150 DATA 33323333
4997 '
4998 ' Set the colour to plot the pixel.
4999 '
5000 x1=(newx MOD screenmode*pixacross)/screenmode
5010 y1=pixdown-1-(newy MOD (pixdown*2))/2
5020 colour=VAL("&"+MID$(table$(y1),x1+1,1))
5030 RETURN
```

```
10 MODE 1:BORDER 2
20 INK 0,2:INK 1,26
30 INK 2,0:INK 3,15
40 DEFINT c,h,i,s,t,x,y
50 x=480:y=200:screenmode=2
60 GOSUB 1000
70 '
80 GOSUB 3000
90 END
997 '
998 ' Draw a complex area to fill.
999 '
1000 DEG
1005 'circle
1010 FOR i=0 TO 360 STEP 10
1020 PLOT 320+200*SIN(i),200+180*COS(i),2:i=i+10
1030 DRAW 320+200*SIN(i),200+180*COS(i):i=i-10
1040 NEXT
1045 'hexagon
1050 FOR i=0 TO 360 STEP 45
1060 PLOT 320+150*SIN(i),200+100*COS(i),2:i=i+45
1070 DRAW 320+150*SIN(i),200+100*COS(i):i=i-45
1080 NEXT
1090 RETURN
2997 '
2998 ' Fill routine.
2999 '
3000 DIM x(200),y(200)
3010 h=0:t=0:xs=x:ys=y:GOSUB 3100
3020 t=((t+1) MOD 200)
3030 xt=x(t):yt=y(t)
3040 IF TEST(xt+1*screenmode,yt)=0 THEN xs=xt+1*screenmode:ys=yt:GOSUB 3100
3050 IF TEST(xt-1*screenmode,yt)=0 THEN xs=xt-1*screenmode:ys=yt:GOSUB 3100
3060 IF TEST(xt,yt+2)=0 THEN xs=xt:ys=yt+2:GOSUB 3100
3070 IF TEST(xt,yt+2)=0 THEN xs=xt:ys=yt+2:GOSUB 3100
3080 IF h=t+1 THEN ERASE x,y:RETURN ELSE 3020
3097 '
3098 ' Plot a pixel.
3099 '
3100 GOSUB 4000
3110 PLOT xs,ys,colour
3120 h=((h+1) MOD 200)
3130 x(h)=xs:y(h)=ys
3140 RETURN
3997 '
3998 ' Set the colour to plot a pixel.
3999 '
4000 colour=1:RETURN
```

MICRONET MANIA

Comms nut Steve Gold goes Viewdata mad and takes a look at Prestel and Micronet.

Micronet has become one the premier on-line systems for Amstrad CPC and PCW users. Comms expert Steve Gold looks at Micronet and asesses its value.

Micronet is the name of a joint?y-administered on-line service on Prestel, the British Telecom viewdata network. The database was set up originally for home micro users in 1983 when the UK on-line scene was almost non-existent, apart from the traditional bulletin board users.

Almost six years later, Micronet has matured into an electronic database of some 35,000 frames of news, information, reviews and software. If that mixture sounds familiar, it is because it is the same formula many magazines supply to their readers.

Micronet has several added advantages over the printed work. First, since it is a flexible medium, information can be 'published' on the network within minutes of an event taking place. Because Prestel is accessible 24 hours a day, seven days a week, the information can be imparted to subscribers almost instantaneously.

Second, and perhaps more important, Micronet is an interactive syste,. Its subscribers can access the database and, if they see something they dislike, can send an electronic message to the system administrators to that effect.

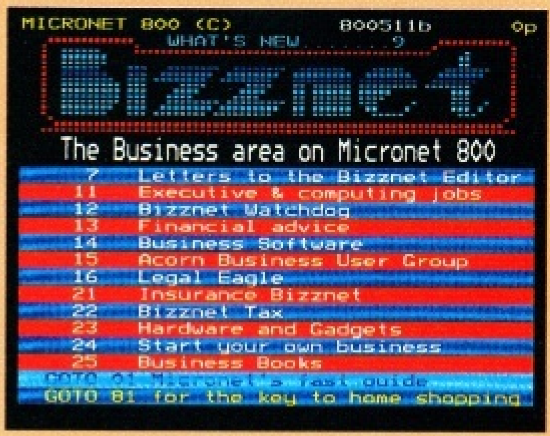
As if that was not enough, the system is geared so that subscribers can have public and private chats with each other, using the on-line equivalent of the Citizens Band radio system.

Hardware

To access Micronet, you need a device called a modem, short for MOdulator-DEModulator. It converts the serially-fed data streaming in and out of your computer into a format which can be sent and received over the telephone network. The reason for the need for conversion is that the telephone network was designed originally for analogue voice calls and not for the digital data that your micro produces.

To connect the modem to your CPC or PCW micro, you will also need a serial interface. In the case of the CPC, Amstrad has produced a special interface which retails for between the £40 and £50, depending on where you buy the unit.

Several other manufacturers have produced a serial interface for the CPC micro. Once of most popular is the Pace unit, produced by the Bradford-based company of that name, for £39-£95. Since Pace is a modem manufacturer in its own right, the company has various deals on modems and communications software. Many of the deals are in the £150 to £200 price range and include a serial interface almost free. Readers should note, however, that Micronet has a free modem offer for subscribers electing to pay their first year's subscritpion – £95 plus VAT – in advance.



In addition to the modem and serial interface, you also need some applications software capable of driving the modem. In essence, communications software acts as an active interface between the serial port of your micro screen, disc/tape drive and keyboard.

The majority of Micronet pages use the colourful viewdata format, similar to that seen on the Ceefax and oracle services on the TV teletext services. This format is 40 columns across by 20 lines down and can contain a surprisingly large amount of information per frame. Unlike the TV teletext services, Micronet is interactive, giving subscribers access to many more frames of information available on an instantaneous basis.

Micronet is accessible as a value-added service on the Prestel database. Because of extensive network modernisation, Prestel is now available at local call rates from anywhere in the U.K. This may not be of vital importance to readers in and around London but many modem users cannot afford the cost of long distance telephone calls, even during BTs cheap rate periods.

Micronet costs £20 per quarter to subscribe. The subscription includes the cost of Prestel, the main on-line database, which has around 250,000 frames of general information. At the time of writing, Micronet has a number of special offers, including a half-price – £9-95 – first quarter subscription offer, s well as the free modem and communications software offer, provided you pay your first year's subscription – $69-95 – in full when you begin your subscription. Subscriptions can be paid by invoicing as well as bank account and credit card direct debiting.

While connected to Prestel, on-line charges are payable for most of the time and for accessing most of the database. Between 8am and 6pm Monday to Saturday, Prestel costs seven pence a minute to access. This is the business period so far as Prestel is concerned and is to be avoided by most home computers.

Outside those hours, Prestel and Micronet costs one penny a minute to access. Between the hours of midnight and 8am, seven days a week, pages in the Micronet area are free of on-line charges. This means that, apart from the cost of a local telephone call, the service costs are included in your quarterly subscription charges.

Costs

Some areas of Prestel and Micronet, notably the business information, and some telesoftware pages, are chargeable. In such cases, the costs are advise well in advance of the pages being keyed up, and are added to your quarterly Micronet/Prestel bill.

This complex charging structure can make it difficult to estimate your quarterly bill from Micronet but most user's bills work out at between £25 and £38, assuming that a few hours a week are spent on-line to the service outside office hours.

Although £25 a quarter, or £100 a year, may sound expensive it still equates only to a weekly charge of just under £2. For your money you gain access to a wide selection of news, updated and available almost on a 24 hours-a-day basis. As well as the expected computer news service, several Micronet subscribers maintain their own areas on the service for readers to enjoy free.

In common with other magazines, *ACU* offers readers free software in the form of printed tabulations. Keying-in this information is, however, a rather laborious and time-consuming process. Micronet allows users to download software from the central computer and into your micro at the rate of more than 100cps.

The concept of downloading software from another computer is known as telesoftware and has been in use on bulletin boards for many years. Because of the special requirements of Prestel, however, the CET telesoftware format is used.

To allow greater flexibility with its telesoftware, Micronet has recently opened a telesoftware gateway which allows subscribers to gateway through Prestel on to, believe it or



not, an Amiga 2000 computer located at the company's London headquarters.

By maintaining the bulk of telesoftware on its local Amiga computer, Micronet staff can make progress available far more flexibly and quickly than by uploading each frame of data individually to the Prestel computers.

The concept of allowing subscribers to use Prestel as a data-carrying network, as opposed to a database in its own right, has been used for several years. Other gateway services on Micronet include a multi-user adventure gateway known as *Shades* and a teleconferencing system known as *Dialtalk*.

The Shades gateway is interesting, since it allows



Micronet subscribers to gain access to a giant multi-user game *MUG*. Shades can be accessed using the standard viewdata format or, if the user prefers, using a scrolling ASCII format.

Shades is an on-line adventure with the capacity for several dozen users to be logged on at once. Since it was launched a few years ago, Shades has grown in stature to become one of the most acclaimed on-line adventures available world-wide.

Shades is eight games in one, to which up to eight players are allocated on a random basis. The reason for the multiple game-playing environment of Shades is simple; it prevents the games getting too crowded and the treasure points being used too quickly.'

Playing Shades is great fun, since it combines the thrills and spills of a single-player text adventure with the ability to interact with other on-line players. The interaction can take many forms and ranges from simple conversational chats with fellow players and friends to players assisting one another in the more difficult elements of the gameplay.

The aim of Shades is to amass as many points as possible and thus achieve wizard, or witch, status. Achieving such an exalted status is not so easy as many single-player/computer games might lead you to believe, since the Shades universe 'exists' on a mini-computer with several megabytes of system memory in which to wander.

The Shades 'universe' has been mapped out by its creators and a map is available on request but half the fun of playing it is to be able to make your own map by exploring the system.

The Dialtalk teleconferencing system, meanwhile, is an extension of the Shades gateway and runs on the same computers as Shades. Instead of users keying-in commands for their game player, however, the system is geared to allow teleconferences to take place.

Dialtalk is a semi-business product for Micronet, since it allows both public and private teleconferences to take place under the control of one or more conference holders. The elements of user control combine to provide a surprisingly cheap way to hold on-line meetings, a service which often is overlooked by many Micronet subscribers.

As well the general computer and technology-related areas of the service, Micronet also provides a wealth of machine-specific areas, covering computers as diverse as the Sinclair Spectrum and the Amstrad PC series. Occupying the middle ground are a number of areas aimed at Amstrad CPC and PCW users. The main area of interest is known as *The Amster's Cage* and is run by several Micronet subscribers, including Dave Dorn and Ian Hoare.

Amster's Cage was, in fact, also rum by Paul Needs, a Micronet subscriber who became sufficiently attracted to Micronet to work at its London headquarters. Today, he is editor of Micronet, an indication perhaps of to what an on-line hobby can lead to.

"Amster's Cage"

Despite being administered by home users of the service, the Amster's Cage area on Micronet is extremely professional, providing the latest news and views from the Amstrad world, as well as constantly-changing variety of hardware and software reviews.

There is a frequently-updated letters area on Amster's Cage, which brings up some interesting correspondence. The immediacy of Micronet means that letters sent one day are usually on-line and available to all by the next day.

That immediacy is due to the Prestel electronic mail service called Mailbox. Frames of data can be entered into the Prestel system and set to another subscriber's or information provider's mailbox. Next time they log-on, the message is ready and waiting.

The Amster's Cage area also provides the facility of subscriber telesoftware, in the same way computer magazines allow readers to send their software for publishing. On many occasions, a problem with a particular piece of new hardware for the Amstrad micro range has been solved by the timely publication of telesoftware to solve the bug.

Micronet is a large and complex database, with many nooks and crannies. Frequent users of the serviced find their own set of areas where they interact with other subscribers. Micronet is a place to meet and enjoy the company of like-minded computer users. Having said that, many subscribers go on-line less frequently, sometimes only once a week, to collect their electronic mail, check the news and so on.

Good Value

In that sense, Micronet is analogous to a printed computer magazine. How subscribers choose to use the services of Micronet is very much their choice. Many infrequent subscribers often find themselves drawn into the interactive services as if by a magnet.

Even during the 60 pence an hour evening rates, Micronet still offers excellent value. While on-line telephone charges boosting the overall cost to around two pence a minute, two hours a week spent on-line to Micronet still costs only £2-40.

In those sessions, it is possible to play an on-line game, exchange e-mail with your on-line pals old and new, download several new and free games, as well as look at the latest chargeable telesoftware.

Added to that, you will be kept up-to-date on what is happening, both in the on-line world and the world of Amstrad computers. Several Amstrad staff are members of Micronet, and surprising internal 'conversations' take place on-line between subscribers and Amstrad staff.

Micronet forms only part of the main Prestel database, which contains on-line information and interactive services on a variety of topics. For many subscribers, Micronet recipes several hours of their time a day. Others, as I have noted, log-on much less frequently. Micronet is a fun place; I should know – I have been a subscriber for more than five years and I have enjoyed every minute.

Further information, including details of the free trial demonstration of Prestel, can be obtained by writing or telephoning:

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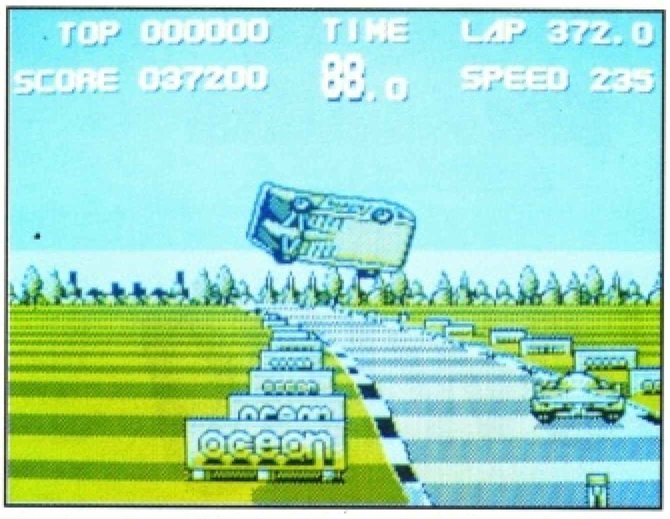
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Driving force



RIK

Back when hydrolics were just wee sprogs and arcade games that featured them were heralded as Gods of the neon palaces, there was a game that set out to break the mould and did so successfully. This game was not original in concept, but definitely a first in cabinet design. This game was WEC Le Mans.**

Although driving games are not a new concept by any stretch of the imagination, and WEC Le Mans makes no pretences in being especially original, the game proves exactly what an Amstrad CPC is capable of. The arcade version is engineered around the infamous 24 hour race held in France every year, and so is the conversion (which is pretty is pretty obvious!) and it allows you to experience exactly what hundreds of drivers go through on the worst day of their lives. The car involved is undoubtedly a porsche, so you know it's going to be high-performance stuff.

The graphics are surprisingly almost mono (almost mono, because many of the colours are shades of green!) but they are so well detailed that this is not a burden. The gameplay is very simple, get past each checkpoint on the course in the time designated and therefore complete a numbers of laps. This is done through weaving your car in and out of others, and careening around hazards and corners (simple, huh?), with simple joystick controls. Left on the joystick turns the steering wheel in that direction as does the right direction, and the fire button changes the gear.

The major thing that WEC has going for it is the fact that it is so darn enjoyable, the playability has been judged just right and the speed is set at a hectic level. Another note worth mentioning is the wonderful crash sequence when the car spins through a series of sprites which makes you wince every time it happens.

Ocean has produced another winner that I'm sure will dominate the charts for many weeks (like Operation Wolf and Robocop) and it is an essential buy for anybody that was fooled by Outrun.

Developer: In house
Tape: £9.95
Disc: £14.95

18/20

Under siege

Code Masters have struck again with yet another simulator game. If it continues at this rate, by the end of the year, it will no doubt be releasing a game called Simulator Simulator. I know these games cost only £2.99 but I get the feeling that the person who writes the inlay card never sees the game as I am afraid phrases like "Move quickly and quietly" and "absolutely brilliant gameplay" have very little to do with this uninspiring shoot-em-up.

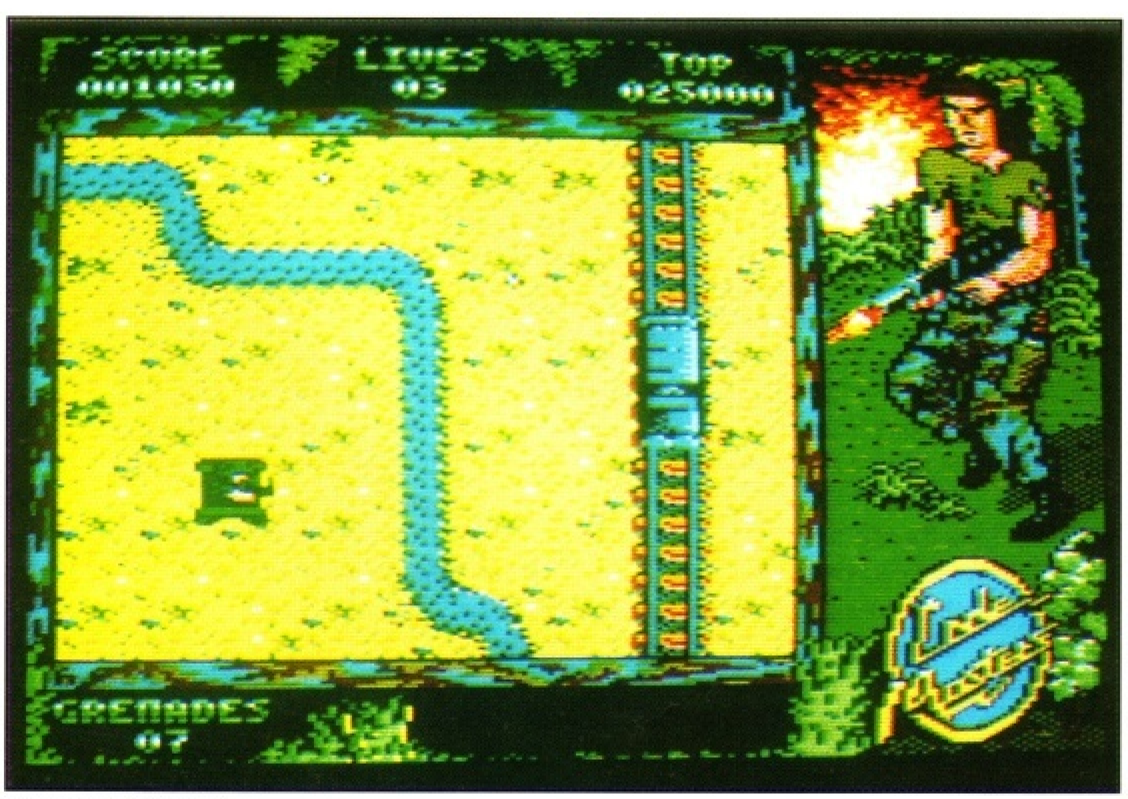
The SAS seems to have been misrepresented as well, as although it is well-known for its covert operations – sabotage, seige breaking and gun sighting – it never goes for all out assaults, which is exactly what you have to do.

The game consists of four top-down battle areas through which you must gun your way and try and kill anything and everything which moves with either your endless shot rifle or your replenishable stock of grenades. Against you are hordes of gun-firing but aimless wandering soldiers, fixed gun emplacements and even the odd paratrooper.

These can be dodged or shot as your real aim is the Code Masters symbols scattered around the screen. Collect one of them and you climb into a jeep and become immune to enemy gun-fire, although how an open vehicle like a jeep can give you total protection is beyond me. Either the bullets would hit you or the jeep, which would probably disable it.

Moving on, you will eventually reach a railway line but them, for some inexplicable reason, the scrolling swaps from right to left to down to up the screen. There is the odd train to shoot as well, which tends to liven up the otherwise dull action. Other top-down landscapes – one even features a shark – are punctuated by sideways kung-fu screens which do little to raise the level of boredom.

Overall, this is definitely a game to miss. I know the usual arguments about budget software but surely Code Masters can do better. Instead, check *Airborne Ranger* which has the same ingredients but also offers 3D graphics, a selection of missions and gameplay which leaves this one out in the cold. It may be three times the price but it is 10 times better.



TONY

Developer: Code Masters
Tape: £2.99

5/20

Mind Blowing

Keith Pomfrit explores the world of Eproms and shows you how to blow your own software.

ROM software is faster, more convenient, loads in a flash and uses very little memory. It is expensive, limited in choice and requires a ROMBOARD so that it can be plugged into the CPC. With the CPC into its fifth year and still out-selling some of the competition, it is not surprising that more people are turning to ROM development as a way of extending their computing power even further.

While companies like Arnor, Romantic Robot, KDS, Goldmark and Graduate have been producing commercial software in this way, there are ROM development tools within the reach of the home user and the price of a blank EPROM is within the grasp of anyone accustomed to software on disc.

To save the ROM/EPROM/PROM confusion, and EPROM is an erasable programmable read only memory and for the other two, deduct a word per initial. Most CPC ROM software is on EPROMs and as such it is possible to erase them and re-program, a necessary feature during development.

What do you need? A good understanding of programming, a firmware manual or similar for the calls, an EPROM programmer and some blank EPROMs. That and two pints of four-star midnight oil.

EPROM blowing

There are three EPROM programmers on the market for the CPC series. John Morrison has produced his model for almost three years; about 2,000 programmers later there is still a steady demand from individuals and institutions.

Microgenic Systems has just launched its programmer and with orders from as far away as Poland and the southern hemisphere, it is the peripheral most likely to travel for 1989.

A new company, Fleet Microsystems, under the wing of Ram Electronics, has a third one just arriving and with the reputation of Ram and dK'Tronics to live up to it should be a worthy contender.

ROM programming, or "blowing" as it is known, is a matter of taking an "empty" EPROM, normally 16K 27128 for the CPC, and writing a program on those empty spaces, in a similar way to the way a program might be written into memory or on to a disc. Once the program is placed on the EPROM it should remain there unless it is erased with high-intensity, ultra-violet light.

A program for putting on an EPROM must be written in a particular way to be able to be loaded and run from within and it must be a binary file. Basic programs need some surgery before they are ready to be put into an EPROM.

John Morrison EPROM programmer.

Suitable for the full CPC range, this programmer has been around for three years and with software updates remains essentially the same machine. Capable of blowing 12.5 and 21V EPROMs, once connected and loaded it is entirely menu-driven. There is a plain white box with an edge connector and a socket for an EPROM. The software is on tape with a program included for converting your Basic programs to run from a ROM with the program doing all the fiddly bits like setting the names and RSXs by a simple prompt menu.

When loaded, the software presents you with a simple mode 2 screen with all the necessary keypresses for the various tasks labelled. This programmer will work at 12.5 and 21V and to change the voltage you have to unscrew the back from the box and re-set a plunger. A fast and a slow programming speed are provided from an initial menu choice.

That is awkward, perhaps, but it means that you do not re-set the voltage without intending to do so. It is pre-set at 12.5V, the safest bet, as 21V could kill a 12.5V EPROM if administered accidentally. Following the prompts takes you through the stages from testing whether an EPROM is blank through to the finished product. It is possible to pick and program individual blocks of any size, individual bytes or 8KB and 16KB blocks.

The instructions suggest that you use a high-quality EPROM such as NEC or Hitachi, as lower qualities may need more current/time and thus fail. I found the Morrison to be satisfactory with NEC, Hitachi and TI EPROMs but it would not look at any others – Intel and Mitsubishi to name two.

The documentation is clear and concise but a novice would probably find it hard going and would certainly need more reference material. At £39.95 complete or £31.95 in kit form it is the cheapest of the three tested. A basic tool for the job, I would have liked to see a Zero Insertion Force socket to make insertion easier. No through connector means that 464 owners with disc drives will have to make do with tape loading and saving.

One final niggle is that the edge connector is slightly high and "jacks up" a 6128, leaving it holding the weight of the computer on the connector. I solved this by putting a short piece of ribbon cable between machine and programmer.

The Fleet Microsystem EPROM Programmer.

Arriving uncased, this programmer connects to the rear of the CPC and extends some 6in. rearwards, laying flat on the table unlike the other two, which stand up. This I found to be a distinct advantage when inserting EPROMs. It is a new product but with the attention to detail I expected from a company with links with Ram Electronics.

There is an excellent quality silkscreen-printed circuit board with the components laid out tidily and logically. When loaded, the software presents a mode 1 screen with an option menu. Selection of EPROM type checks for whether the EPROM is blank and various diagnostics can be carried-out from this menu.

A ZIF socket makes insertion of EPROMs child's play and a red LED warns when programming is taking place and the socket is volatile. This is the only board able to program 27256 chips and does them in two passes, high and low. It is able also to handle 2764 and 27128s, with dual voltage selectable by a small interchangable link to the right of the ZIF socket.

A criticism of the ZIF socket is that there is no way of telling which way the EPROM goes in, other than by following the indentations of the ICs on the board. There is no editor in the software and when I asked Martin Shoebridge of Fleet why, he replied: "The kind of person using the blower will have an Assembler/Editor on which he has developed it and will find that more comfortable to use than anything we could include."

down to business

I agree, finding the Maxam editor I use more than adequate. Down to the business of programming and the Fleet Programmer devoured all but one EPROM satisfactorily, this being the infamous Mitsubishi which hung on grimly to its blank look whether tried fast, slow, 12.5 or 21V. The menus are easy to follow and the prompts take you through the process by multiple choice.

When I received this programmer to review there was no paperwork with it. It is a measure of the user-friendliness that when the instructions arived two days later I had already programmed several EPROMs with it. It is a well-made programmer which supports dual speed and voltage and will tackle all but the toughest EPROMs.

The "danger" light to warn when the socket is live is a thoughful innovation and the lay-flat aspect means less strain on the connection with the CPC. Costing £69-95 it cannot be called cheap but for the programmer wishing to develop software it is a reasonable investment.

Microgenic Systems EPROM programmer.

Rotherham-based Microgenic, which recently produced the advanced EPROM expansion card, has followed it with an EPROM programmer designed to complement it. Microgenic makes a full range of EPROM development tools with an EPROM eraser and an anti-static EPROM carrying box making up the set.

Another uncased board, this facilitates the fastening of it to the expansion card using the pillars provided and the two then fit snuggly on the back of a CPC. The EPROM programmer has comprehensive instructions and is designed to blow only the modern 12.5V EPROMs. David Jewitt of Microgenic explained this, saying: "Some of the older EPROMs were innefficient using up to 100ma of current and, with modern technology have made EPROMs more efficient and operating on lower voltages, there was no need for the higher voltage."

The board is powered by a separate transformer, thereby not contributing to the power drain from the CPC and is laid out in a way as to make use easy. There are red and green LEDs to signify "safe" and "unsafe" for the removal and insertion of an EPROM and the EPROM is held in place by a high-quality ZIF socket.

A re-set button is provided to re-set the CPC and the

whole thing stands firmly behind the keyboard. A slight problem was that when the EPROM card was attached to the programmer, it was easy to "lose" the EPROM between the two and have to power down to remove it.

The software gives the option of either the standard programming Algorithm – slow – or the Intel Intelligent Algorithm. The intelligent algorithm works by sending a 1ms pulse, trying to verify it and, if it verifies, moving to the next BIT. If it does not verify, it will send another pulse of 2ms and so on to a maximum of 70ms. In this way, it programs the EPROM at the fastest and most effecient rate; 2764 and 27128 EPROMs are supported. It programmed every 12.5V EPROM we fed it, getting hiccups only when given a 21V one by mistake.

Prompts and menus make it easy to drive and the instructions with it are a useful introduction to programming EPROMSs with an example program setting out the protocols. Good value at £69-95, I was impressed by the attention paid to detail by Microgenic and the full range of complementary EPROM products available off the shelf. A Rolls Royce on a printed circuit board would be a worthy description but I do not know where they will fit the Flying Lady.

limited budget

With the Morrison programmer at £39-95 this will be the undoubted choice for someone on a limited budget but for a development tool to complement the serious programmer I think the Microgenic programmer wins by a short head for its extra useful features and product support. That is a personal preference only and if you want to program 21V EPROMs Fleet has the tool for you.

How is it done. Having bought an EPROM programmer, how do you develop software for it? It would take a complete article even to scratch the surface but to get you thinking here are two hints.

If you can program in Basic but are frightened of the dreaded machine code, the John Morrison software allows you to convert a Basic file to binary and then run it from an EPROM. Any Basic file of less than 16K can be converted. When called by an RSX, it loads in the same way it would load from tape or disc but it is always there instantly.

Next month the series continues with an article on blowing Eproms.





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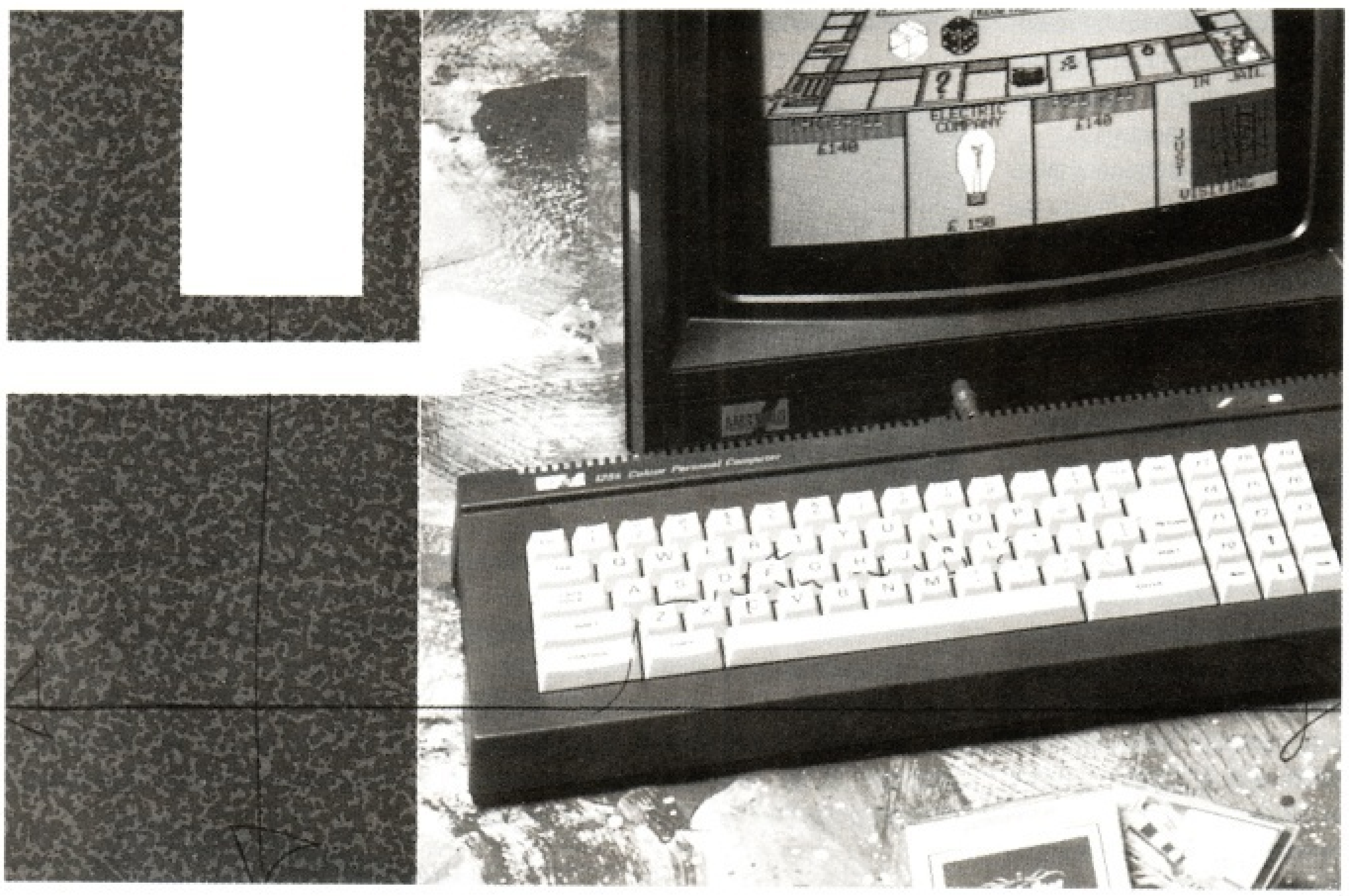
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Sounds of Science

Are you a budding Beethoven or a would-be Wagner? If so, Keith Pomfret may have the answer as he reviews Foundation Musical Spreadsheet.

For two years there have been various Midi packages for the Amstrad CPC series. EMR with its Miditrak, DHCP with the Eight Track Sequencer and the RAM Music Machine, all of which were tested in *ACU* in February.

Hardware engineer Chris Owen had tried two of these to use with his new Yamaha PSS680 multi-timbral synthesiser and although they did the job, he wanted more. So he formed Foundation Software.

The EMR and DHCP sequencers both work in real-time which means what you play is what you hear. That is very well for the concert pianists among us but what about the musician who wants to be able to enter his music on a blank sheet in a more scientific manner?

That is where a step-time sequencer comes into its own. Each note can be assigned its pitch duration and volume individually. Midi is a set of protocols which standardise all the data and so even a novice could lay down a masterpiece using a step-time editor.

With software development costs running into many thousands of pounds it seemed to Owen that the route to follow was to utilise an existing interface and write software for it. He travelled to Ram Electronics where Martin Showbridge gave him all the necessary data.

"When this chap asked for port addresses and things for his own Midi software," says Shoebridge, "I thought that would be the last I would see of him. Two weeks later he was back with the finished product and it is good. It sounds like an orchestra in the room – and in two weeks.

Needless to say, Ram was Owen's first customer, buying one of the prototypes. Foundation Software was born and the Amstrad CPC finally had a step-time sequencer.

Musical Spreadsheet

The prototype was written for a Yamaha PSS680, a multi-timbral instrument, and took advantage of the percussion as well as the music to make a fully-fledged sequencer/drumulator. Planned originally wtih six voices assigned to Midi tracks 1-6 and four percussion lines on track 16, it has evolved to eight voices, each assignable individually to any of the Midi channels and the four percussion lines assignable, too. The development of the line assignation means that the voices can be assigned in such a way as to make a synthesiser which is only mono-tymbral play polyphonicaly.

After an initial leading screen, simple menus take you through the option of loading/saving, editing a song, editing a bar and so on. In most music, some of the bars and patterns repeat and a useful feature is the ability to assemble individual bars and then place then in an overall song structure screen.

In simple terms it is a musical spreadsheet. You enter the notes and formulae into a bar, then place that bar in the 'cell' in which it plays an overall sone structure screen.



To convert numbers to notes and vice versa, a reference table is provided, with the numbers – Midi 24-108 – set out above a piano keyboard and also on a musical stave. To test the feasibility of this, I entered three complete songs using sheet music and the reference sheet in slightly less than 50 minutes. A separate table is provided for the percussion as per Yamaha PSS680 and could be converted for, say, the Roland MT32 or the or the Ensoniq.

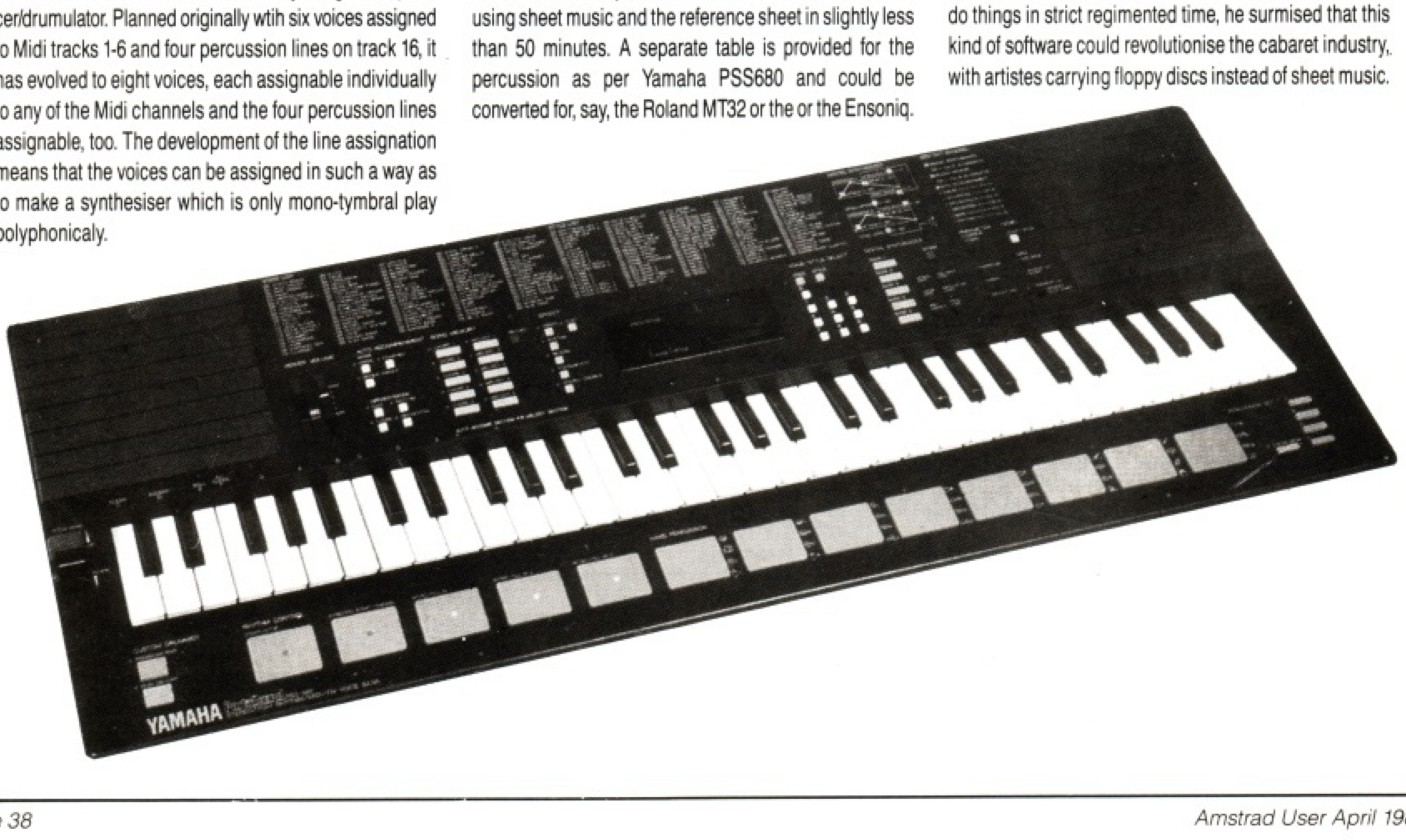
The step-time sequencer has its uses in both studio and home where it makes a lively backing instrument with full percussion or even a soupcon of slithering synths. I took it to Paul Eanor, a professional keyboard player and guitarist who looks on a keyboard both as a solo and a backing instrument. Commenting on its simplicity, he remarked: "If entering music had always been so easy, I would not have taken the trouble to learn theory."

Eanor took the sequencer into the studio and his verdict was: "After years of playing from a music stave, it is great to be able to do it at my own pace without that damned metronome calling the time. The idea of deciding what goes in the bars individually and then putting them in can save me a wealth of repetition in something monotonous and boring like a twelve bar."

"Stairway to Heaven"

Eanor played me an arrangement of *Stairway to Heaven* played on the MT32 accompanying his acoustic guitar. "I would have liked more sensitivity in the volume settings," he said, "but the crescendos are adequate."

Leaving him to muse about pop festivals, hippies and the seventies, I visited Bob Daviot, the musical director for several hotels and nightspots. Picking up on its ability to do things in strict regimented time, he surmised that this kind of software could revolutionise the cabaret industry, with artistes carrying floppy discs instead of sheet music.



"It still needs the edges knocking off it," he said. "It has to be good with every piece of Midi equipment to take off." He plugged into a guitar synthesiser and, using the multi-timbral mode to drive each 'string' separately, achieved a texture I had not heard this side of a Fairlight – the instrument, not the game. With the ability to vary the volume on each channel it was possible to achieve a 'strummed' effect and a 'layered' effect.

At £29-95 for a disc with the main sequencer file and six music demonstration structures ranging from Far Elise to Funk, its value is in that it can be used by a beginner. It is a simple task of working out the note values and pitch against the data and putting them into a pattern. To prove this I 'borrowed' Jackie Rutter, a lass without a musical bone in her body – her words – explained the idea and let her get on with it.

After two false starts she was programming. "An uphill struggle," was her first comment but, as she realised how it worked, the frown of concentration deepened and, soon, a reasonable interpretation of the Yazoo song *Only You* with two timeslips and an 'OUCH' chord or three.



That was achieved by a non-musical non-typist with no interest in music or computers, press-ganged into it at short notice and with only the vaguest help from me – all in all, a good two hours work.

For a project to see its birth and implementation in such a short time would normally make me wary of its results but Owen has been helpful all along, explaining the modular way in which the production version runs and providing an open-ended sequencer which can be used by novice and expert alike and is structured so logically that it would make an ideal stepping-stone to greater things.

Beware, hackers; you will have to hack quickly to keep up with Owen. As a hardware engineer in a commercial environment, he is used to thinking on his feet and the speed with which he implemented a suggestion, tried the alternatives and got back to us with an answer was astounding.

The Multi Track Step Sequencer is available from Foundation Software.

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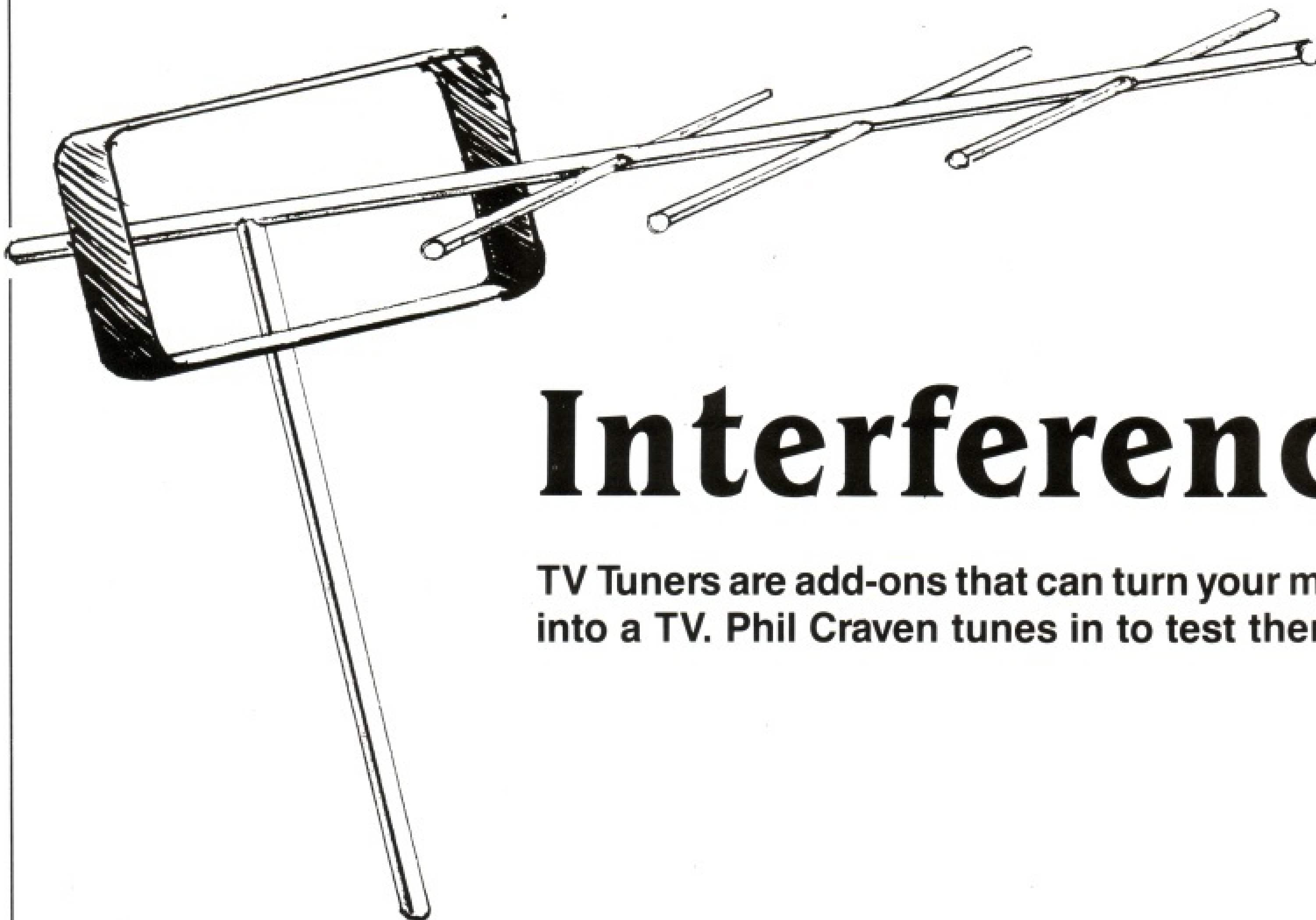
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Interference

TV Tuners are add-ons that can turn your monitor into a TV. Phil Craven tunes in to test them out.

We have all seen advertisements for tuners which will turn our colour monitors into our personal TV sets. We have probably all wondered if they are any good. Is the Amstrad monitor resolution good enough for television and, if so, which is the best tuner to buy and why – were questions – which I wanted answers before I committed cash to one of those desirable little devices.

Fortunately, I managed recently to obtain all three currently-available models for comparison checks and I will share my findings with you.

I can say that the Amstrad monitor is certainly good enough for television. There is no noticeable picture difference between it and any other good TV set. On the other hand there are significant differences between the tuners, both in picture quality and features.

Of the three, only two, the Screenvision and the dK'Tronics, are normally sold on their own. The third, Amstrad, is normally sold either as part of the Entertainment Centre package which includes a 6128 monitor, an alarm clock/radio, bundled software, a joystick and a desk together with the TV tuner, or as the same package but without the 6128, monitor or desk. Comet stores are selling the tuner separately, so we can make direct comparisons.

Aspects common to all models are that each has a small built-in speaker so that the sound is somewhat thinner than usual, but you soon become accustomed to that and they all use a standard aerial. Whether or not an indoor aerial can be used depends entirely on the signal strength in the area. If one will work with an ordinary TV set will it work with these tuners, as will a video recorder? The answer is no. You cannot video-tape your computer gaming prowess. You cannot have the TV and the computer on at the same time.



The Screens TV tuner.



The Amstrad entertainment cycle. (INSERT) The d'kTronics tuner.

The 5-pin din plug from the monitor is connected to either the computer or the tuner but not both. You cannot even switch between the two on any of the models, not even on the Amstrad. You have to pull out the plug of one and puch it in the other and that surprised me. Perhaps someone might produce a cheap little switch which will allow me to continue trying to get through Auntie John's machine code course while flicking over frequently to see if 'Allo 'Allo has started.

The dK'Tronics tuner, cased in black-finished metal and with its own power supply, resides behind the computer with the monitor on top. Although its position means that the monitor leads cover part of its front; making access to it slightly more difficult. It is, nevertheless, the best place for it as most of us have machines on desks and tables where space is at a premium. Controls are on/off/volume, brightness, colour and rotary channel selector.

excellent picture

It produces plenty of brightness and colour and an excellent picture. I would like to turn down the contrast a little but, without a control, it was a little difficult. Still, it is better to err on the bright side than the dull.

As it was designed for the Amstrad, it is possible to connect it to different linear RGB monitors and this is worth noting by those who might one day move to a different computer. The tuner can go with you.

Like the dKT'ronics tuner, the Amstrad rests under the monitor with the leads across its front, it is cased in strong plastic, matching the CPC livery. Controls are a volume, colour, contrast and rotary channel selector. The brightness control is on the side of the monitor. Power is taken from the 12V monitor outlet, so those without this type of monitor would also need an MP2 modulator.

Its picture quality is excellent, as is its colour, yet I have one little complaint. It has the contrast control but I would have liked a little more brightness. Nevertheless, it is eminently watchable.

I cannot leave this model without mentioning the other items in the package. The alarm clock/radio, which again can be bought separately for £14.99, matches the tuner and stacks with it and the monitor. Its three wave bands, LW, MW and FM, provide the kind of quality one would expect from a clock/radio of its price and its half-inch red LED alarm clock would be brilliant if the monitor leads did not partially cover it. Even though the radio quality is affected when the monitor is on – badly on MW – it is still an excellent little extra at the price.

The joystick is nothing special and the software is satisfactory if you like such oldies as *Hunchback 1 and 2*, although one or two better titles, like *Trivial Pursuits*, are included. When bundled, the tuner, radio, joystick and software can be bought from the Amstrad User Club for £109.99 or £89.99 to members. The black computer desk costs £10 extra.

Annual subscription to the User Club is £24.95, which includes 12 free issues of *ACU* valued at £16.50, membership rates costs £8.45. Buy the TV package at the members' rate, saving £20, and you are £10 ahead.

Housed in two-tone grey plastic, the screen vision unit made originally by Rediffusion, has been modified by components manufactured and assembled by Screens and can be connected to any monitor with either composite or linear RGB input.

It is not designed to reside under the monitor, so about 16in. x 9in. of desk space is needed. As well as its own power supply it has features I would have liked to have seen on the other two. It has eight push-button channel selectors, which I prefer to the rotary type. It has an audio out socket, so that the sound can be fed to a hi-fi set-up, as well as volume, colour, brightness and contrast controls.

What it does not have is a satisfactory picture. It is clear enough but, to achieve any colour intensity, I had to turn the brightness well down, the contrast down as low as it would go and the colour up full – and even those measures did not produce enough. If it had done, the picture was so dull as to make watching unpleasant. I regret that I have to report this fact but it must be said.

unmodified version

On the other hand an unmodified version is available, for home assembly, which might be just the thing for electronics buffs. I have not seen it, but at £22.95 it cannot be bad.

All the units will work as tuners for the teletext adapter featured in the January issue and the correct lead to connect a particular tuner to the adapter will be supplied by Microtext on request.

Quick-thinking readers might have wondered about the possibility of grabbing the monitor 5V lead, by mistake, and plugging it into the 12V outlet. Fortunately, the Amstrad design ensures that both the 12V and 5V lines are fed straight to ground and, so long as the situation does not remain for long, no harm is done.

All three versions are well-made and look good but I do not have definite answers to all my original questions. The monitor is capable of displaying excellent TV pictures and the Amstrad and dK'Tronics units are capable of producing them but whether the small differences between them matter or not is a choice only a buyer can make. Having had the advantage of comparing them directly, I cannot say which is best. I can say that both models are sure to delight and not disappoint a new owner.

dK'Tronics tuner: £79.95 from Ram Electronics (Fleet) Ltd, Unit 16, Redfields Industrial Park, Redfield Lane, Church Crookham, Hampshire GU13 ORE. Tel: 0252 850085.

Amstrad TV tuner: Official Amstrad User Club, Enterprise House, PO Box 10, Roper Street, Pallion Industrial Estate, Sunderland SR4 6SN. Tel: 091 510 8787.

Screenvision: Screens Microcomputers and Electronics, Main Avenue, Moor Park, Northwood, Middlesex HA6 2HJ. Tel: 09274 20664. State that the CPC version is required.

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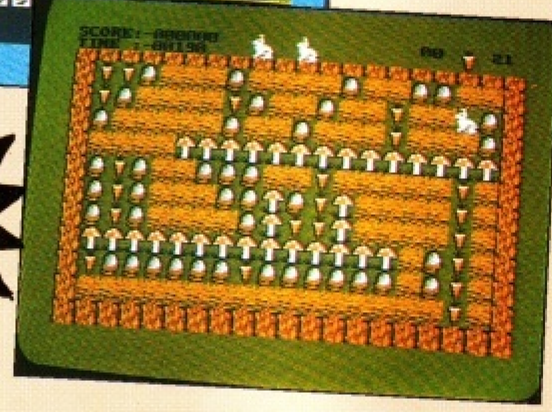
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TO order please use the form on Page 73

Printing Problems

Only having seven bits on your printer port is a problem. Jeff Walker offers advice.

Printers appear to be the biggest single cause of problems with applications software. I suppose this is only to be expected when there is such a wide range of available, each offering its variations of features and many of them using different control code sequences.

With the best will in the world there is no way software companies can test their programs with every model of printer, nor provide details of how to configure a program to work with all of them. One of the most common problems is persuading the printer to print a pound sign instead of the hash symbol.

I propose to cover this in some detail, in the hope that it may solve the problem for many people. The difficulty is that the pound symbol is not part of the standard ASCII character set and, as a result, it is allocated a value outside the standard ASCII range. Unfortunately, because there was no standard, it has been given different values by various computer and printer manufacturers. In the case of the CPC, the value is decimal 163.

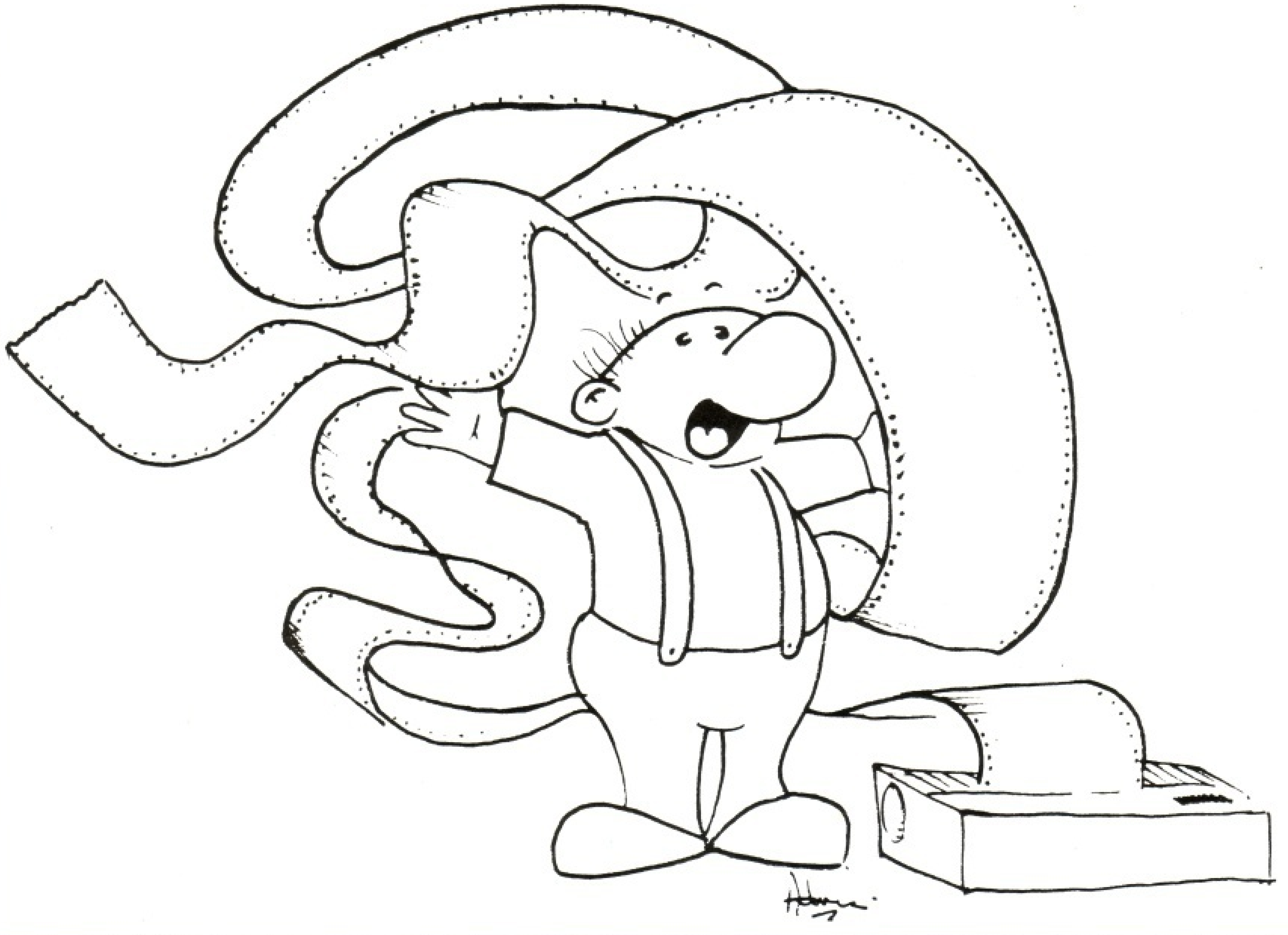
Printer manufacturers have adopted various methods for printing the pound. In some cases, particularly printers capable of handling the IBM extended character set, the pound is allocated an extended ASCII code, decimal 156. If this is the case, re-defining the code sent by the application from 163 to the 156 required by the printer should do the trick.

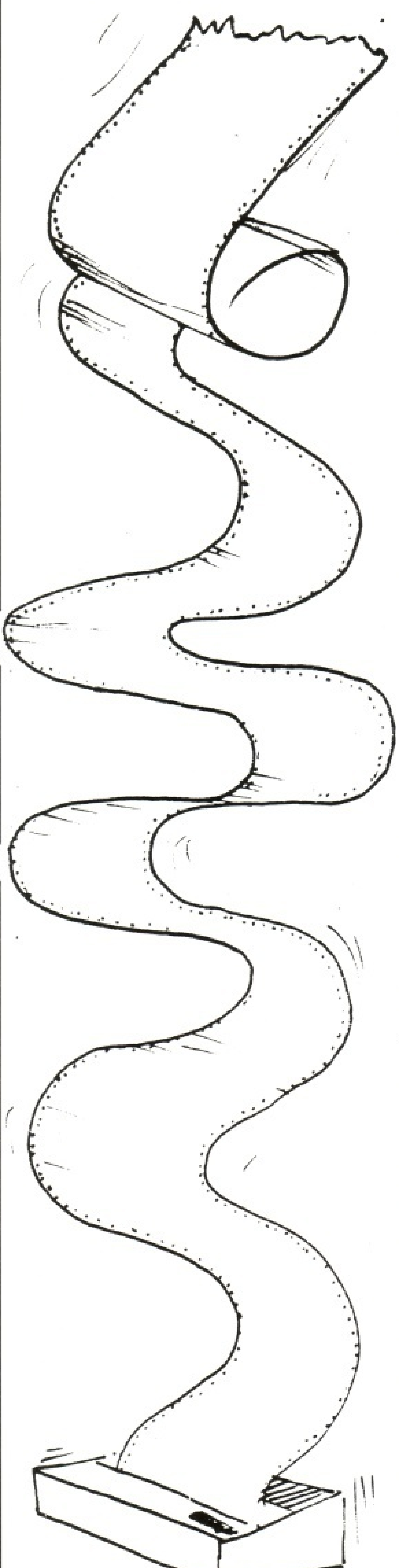
It does not solve the problem on the Amstrad CPC range, as the 7-bit printer port will allow characters only up to 127 to be sent to the printer, but some printers are provided with a control code sequence which tells the printer "The code that follows should have 128 added to it."

With printers with this facility, sending the code sequence, followed by the value for the printer pound sign, less 128, will result in the pound being printed. Sending (extended code sequence) followed by the decimal 28 code will result in the printer adding 128 to give the required value of 156 on a printer with an IBM character set.

Control Codes

Epson and compatible printers do not provide the pound sign as a single code. Instead, it is provided as part of the U.K. International Character Set, in which case the dollar is replaced by the pound so that sending the code for the hash symbol – decimal 35 – will result in the pound being printed. It is possible normally to select the U.K. character set either by means of the dip switches or by sending a control code sequence to the printer.





The disadvantage of using the dip switches is that it is not then possible to print the hash sign, which can be a nuisance, particularly. If you are in the habit of printing Basic program listings: if possible, it is better to select the U.K. character set with the control codes, so that you can set it back to normal after printing the pound.

Some programs, such as *Protext* and *Tasword*, allow you to re-define certain characters so that they are intercepted before being sent to the printer and translated into the required sequence. If the application will allow it, the solution is to turn on the U.K. character set before printing the pound, then turning it off afterwards.

"The disadvantage of using the dip switches is that it is not possible to print the hash sign."

In the case of an Epson-compatible printer, re-defining the translation code for pound sign to send the sequence:

[(27, 82, 3, 35, 27, 82, 0)]
will switch to U.K., send the code for hash, which will be printed as the pound, then switch back to the U.S. character set. Alternatively, you could turn on the U.K. set and print the pound with:
[(27, 82, 3, 35)]
and re-define the hash code translation to turn the U.S. set back on with:
[(27, 82, 0, 35)]

International characters will remain set for the U.K. characters until a hash is printed. It can, however, be useful where only a limited number of characters may be translated and transmitted.

Daisy-wheel printers differ in the way they produce the pound symbol – in some cases they do not. Assuming the daisywheel being used has a pound sign on one of the petals, it should be possible to print it.

In some cases, the only solution is to obtain a daisywheel with the pound sign, in which case it will probably replace either the hash or the dollar symbols. If so, re-defining the translation for the pound will mean that at least you can see the pound on-screen and know it will be printed as well.

Some daisywheel printers allocate a simple code value to the pound, while others access the pound by sending a control code sequence rather than a single character. In either case, re-defining the pount to the new value from within the application should solve the problem.

I have received one or two enquiries about the practicality of transferring data between a CPC and an IBM-compatible computer. ASCII Data and text files from a CPC may used on a PC with no difficulty once you have transferred it to the PC but the problem is transferring the data between the two machines.

If you have an RS232 sesrial interface for the CPC, the problems are minimal, as connecting the serial ports of the two computers with a Null Modem cable and using a Communications program at each and ensures the data is transferred relatively quickly in either direction and without corruption. This is the method I use regularly to transfer data between computers. While it may not be so fast as just swapping discs, it is relatively cheap, reliable and straightforward.

Whilst is it possible to connect a 3.5in. SPS type drive to a PC, it is not possible for the PC to read or write to or from CPC format discs. CP/M 2.2 has an IBM format option but this does not solve the problem as the discs can still not be read by the PC as the format is not the same as current PC compatibles.

It is possible to use 5.25in. drives with the CPC and some are supplied with software to configure the drive for the CPC and include programs to allow discs of various formats to be read, including IBM format. If you decide to choose this option, I would recommend that you make sure that it will do what you require before buying.

AtLast!

Arthur Moore of Prestwich uses the original *AtLast* database and wants to know whether it is worth upgrading to *AtLast Plus* and whether data files from the earlier version are compatible with the new version.

AtLast PLus has a number of new features, one of the most important being that it stores data in variable length records, whereas the old version used fixed length records. This can mean an enormous saving of disc space if you frequently fill fields only partially with data, which means you can handle larger databases. There are many other changes, particularly to the method of viewing and scanning data and selection options may be specified as well. It is also possible to enter new records while scanning, rather than having to goto the Insert New record option to do so.

Overall, I would say that if you use AtLast it is worth upgrading to the new version, which is simpler to use and more powerful.

Existing AtLast Data files are not directly compatible with the new version, due to the more efficient way in which data is stored, but the procedure to transfer data is straightforward, requiring you to create a simple report from and export the existing data to an ASCII file.

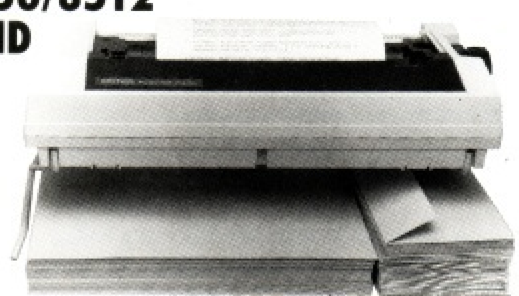
"Overall, I would say that if you use AtLast! it is worth upgrading to the new version."

You then define the database in AtLast Plus, using the same number and type of fields, create a form with the fields in the order they were exported, select the Batch entry option and read the data from the ASCII file. The process is simple, though slightly time-consuming, but you can largely leave it unattended while it gets on with it.

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Datagen

Typing in this program will assist users with the task of creating those hexadecimal data statements. The program can be used in two ways. First, it can assist the user by checking inputted data by use of a chscksom. Second, data blocks can be created and then saved by using the program.

Key in the program exactly how it appears. If you have any problems, please check your typing very carefully.

One entered and debugged, the program should be saved to tape or disc. To run it, just type RON and follow the prompts.

```
100 REM ***************************
110 REM *                         *
120 REM *      DATAGEN.BAS        *
130 REM *                         *
140 REM * (c) Anthony A. J. Shaw *
150 REM *                         *
160 REM *     December 1988       *
170 REM *                         *
180 REM ***************************
190 REM
200 REM *** Setup and initial questions ***
210 DEFINT a-z
220 MODE 2
230 bckspc$=CHR$(8)+" "+CHR$(8)
240 h$=""
250 INPUT "File name ";f$
260 OPENOUT f$
270 WHILE items<=0
280 PRINT
290 INPUT "Data items per line ";items
300 WEND
310 WHILE size<=0
320 PRINT
330 INPUT "Data item size (in hex characters) ";size
340 WEND
350 datamp$="&"
360 PRINT
370 PRINT "Leading ampersand on data items";
380 GOSUB 1170
390 IF ans$="N" THEN datamp$=""
400 datasep$=","
410 PRINT
420 PRINT "Seperate data items with commas";
430 GOSUB 1170
440 IF ans$="N" THEN datasep$=""
450 PRINT
460 PRINT "Checksum required";
470 GOSUB 1170
480 chksum$=ans$
490 IF chksum$="N" THEN GOTO 690
500 chkfixed$="Y"
510 PRINT
520 PRINT "Is the checksum fixed length";
530 GOSUB 1170
540 IF ans$="N" THEN chkfixed$="N":GOTO 590
550 WHILE chksize<=0
560 PRINT
570 INPUT "Checksum size (in hex characters) ";chksize
580 WEND
590 chkamp$="&"
600 PRINT
610 PRINT "Leading ampersand on checksum";
620 GOSUB 1170
630 IF ans$="N" THEN chkamp$=""
640 chksep$=","
650 PRINT
660 PRINT "Seperate checksum from data items with a comma";
670 GOSUB 1170
680 IF ans$="N" THEN chksep$=""
690 WHILE ln<=0
700 PRINT
710 INPUT "First line number ";ln
720 WEND
730 WHILE inc<=0
740 PRINT
750 INPUT "Line number increment ";inc
760 WEND
770 CLS
780 REM *** Main loop, data entry and editing ***
790 PRINT ln;datamp$;
800 a$=""
810 WHILE a$="":a$=UPPER$(INKEY$):WEND
820 IF a$="R" AND LEN(h$)=0 THEN GOSUB 1330:GOTO 1120
830 IF a$="X" AND LEN(h$)=0 GOTO 1140
840 IF a$=CHR$(127) THEN GOSUB 1260:GOTO 800
```

```
850 IF (a$<"A"OR a$>"F") AND (a$<"0" OR a$>"9") GOTO 800
860 h$=h$+a$
870 PRINT a$;
880 IF LEN(h$)=items*size THEN GOTO 910
890 IF (LEN(h$) MOD size)=0 THEN PRINT datasep$;datamp$;
900 GOTO 800
910 REM *** End of data line, display checksum if required ***
920 IF chksum$="N" THEN GOTO 990
930 FOR i=1 TO items
940 tot=tot+VAL("&"+MID$(h$,(i-1)*size+1,size))
950 NEXT i
960 tot$=HEX$(tot)
970 IF chkfixed$="Y" THEN
tot$=STRING$(chksize-LEN(HEX$(tot)),"0")+HEX$(tot)
980 PRINT chksep$;chkamp$;tot$;
990 REM *** Ask if everything is ok ***
1000 GOSUB 1170
1010 IF ans$="N" THEN GOSUB 1490:tot=0:GOTO 810
1020 REM *** Write data to file ***
1030 PRINT £9,ln;"data ";
1040 FOR i=1 TO items-1
1050 PRINT £9,datamp$;MID$(h$,(i-1)*size+1,size);datasep$;
1060 NEXT i
1070 PRINT £9,datamp$;MID$(h$,(items-1)*size+1,size);
1080 h$=""
1090 IF chksum$="N" THEN PRINT £9:GOTO 1110
1100 PRINT £9,chksep$;chkamp$;tot$
1110 tot=0
1120 ln=ln+inc
1130 GOTO 790
1140 REM *** Close data file and exit ***
1150 CLOSEOUT
1160 END
1170 REM *** Get a yes/no answer ***
1180 ans$=""
1190 PRINT " (Y/N ) ? ";
1200 WHILE ans$=""
1210 a$=UPPER$(INKEY$)
1220 IF INSTR(1,"YN",a$) THEN ans$=a$
1230 WEND
1240 PRINT ans$
1250 RETURN
1260 REM *** Process delete ***
1270 IF h$="" THEN PRINT CHR$(7);:RETURN
1280 PRINT bckspc$;
1290 IF datasep$<>"" AND LEN(h$)>0 AND (LEN(h$) MOD size)=0 THEN PRINT
bckspc$;
1300 IF datamp$<>"" AND (LEN(h$) MOD size)=0 THEN PRINT bckspc$;
1310 h$=LEFT$(h$,LEN(h$)-1)
1320 RETURN
1330 REM *** Allow entry of a remark ***
1340 IF datamp$<>"" THEN PRINT bckspc$;
1350 PRINT "Enter remark ";
1360 rm$=""
1370 WHILE a$<>CHR$(13)
1380 a$=INKEY$
1390 IF a$=CHR$(13) THEN GOTO 1450
1400 IF a$<>CHR$(127) THEN GOTO 1430
1410 IF LEN(rm$)<>0 THEN rm$=LEFT$(rm$,LEN(rm$)-1):PRINT bckspc$;
1420 GOTO 1450
1430 rm$=rm$+a$
1440 PRINT a$;
1450 WEND
1460 PRINT
1470 PRINT £9,ln;"rem ";rm$
1480 RETURN
1490 REM *** Reprint data line without last character ***
1500 PRINT ln;datamp$;
1510 FOR i=1 TO items-1
1520 PRINT MID$(h$,(i-1)*size+1,size);datasep$;datamp$;
1530 NEXT i
1540 PRINT MID$(h$,(items-1)*size+1,size);
1550 PRINT bckspc$;
1560 h$=LEFT$(h$,LEN(h$)-1)
1570 RETURN
```

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Fractal Landscapes

Dean Cracknel starts a series of articles on generating Fractals.

The next time you are passing through Norway, on your way to the shops look at the fjords, because they are well worth a visit. No matter how closely you look at them they still have crinkly edges, looking like smaller fjords.

If you wanted to create fjords of your own, there are two ways to do so. The first involves rubbing large amounts of rock, sea and ice together for a few million years but, more often than not, all you will have is cold, muddy seawater. The second approach is to take a computer, like a CPC, apply fractal transformations to some random numbers and, within minutes – instant fjords.

The magic word of course, is fractal. It is a very simple function which, produces very complex patterns and has become synominous with computer graphics. You may have already seen Mandelbrot Set and Dragon curve programs and you may have played games thich feature fractal landscapes, such as *Koronis Rift*, *Sentinel* or, more recently, *Captain Blood*.

Fractals are shapes produced by applying a series of rules repeatedly to a simpler shape; the more times you apply the rules, the more complex the shape becomes, revealing more detail and allowing you to look closer at the shape.

If small errors creep into the calculations, the pattern will deviate quickly from the original shape to produce a new but still related shape. An example is to take two points, A and B, and give each a random height, height A and height B. Next we need to invent a rule for creating a new height for the point midway between them, for instance, "At the midpoint the new height is the average of the two original heights." This will give us three points; the second application makes five points, the third makes nine.

Each time the rule is applied, new points are created and this could continue until there are an infinite number of points and the distance between them is so small as to be unmeasurable. Listing one illustrates this technique. Because we are plotting the results to the screen, the program will stop when the distance between two points is 1. The WHILE...WEND loop steps through the array, halving the STEP size for the FOR...NEXT loop, halving the distance between the points. Type-in this listing and save it as "prog1.bas".

Program 1. Hint: use AUTO 1000 to type-in the listing.

<<< List "PROG1-1.BAS" here >>>

```
FRactal Landscapes              Program 1       Article 1

1000 ' 2-D Fractal Landscapes
1010 ' Program 1
1020 '
1030 '
1040 DEFINT a-z: INPUT "Enter Seed:";iseed
1050 MODE 0: xscale=4: RANDOMIZE (PI+iseed\PI): PRINT "Seed = ";iseed
1060 size=128: DIM height[size]: maxheight = 400/4
1070 height[0]=maxheight+RND*maxheight
1080 MOVE 0,0: DRAWR 0,height[0],1
1090 height[size]=maxheight+RND*maxheight
1100 MOVE size*xscale,0: DRAWR 0,height[size]
1110 midpoint=size: maxh = maxheight
1120 WHILE midpoint>1
1130  half=midpoint/2
1140  FOR midx=half TO size-(half) STEP midpoint
1150   height[midx]=( height[midx-half] + height[midx+half] )/2 +
       (1-2*RND)*half
1160   PLOT midx*xscale,height[midx],4
1170  NEXT
1180 midpoint=half
1190 WEND
1200 END
```

When this program has been entered, saved and run, enter a number for the random number seed, which will be used to generate two random points. In the example, 5 has been used. As you will see, the effect is to draw a straight line between the two points. Incidentaley, this is a faster method than the ones used traditionally by line-drawing rountines but is never used because each point on the line has to be held in an array, which is generally impracticable. This does not look like a landscape, so a small random error is added to the calculation each time and the effect is somewhat different. To see this, change line 1150 to read:

```
1150 height(midx)=( height(midx-half) + height(midx+half) )/2 + (1-2*RND)*10
```

Save the modified program and run it. Now the line changes into a line which weaves randomly round the original. Unfortunately this line is very erratic and still does not resemble any natural geological occurence. So now make the amount of error we add smaller for points which are closer together by changing lines 1150 and 1180 to read:

```
1150 height(midx)=( height(midx-half) + height(midx+half) )/2 + (1-2*RND)*maxh

1180 midpoint=half: maxh=maxh / 2
```

Finally, we have a smooth random curve which could easily be used to represent the horizon of an imaginary landscape; the results of all three versions of the program are shown in figure one. Now we can state out refined rule:

"At the midpoint, the new height is the average of the two original heights plus some error, which is proportional to the distance between them", which looks like:

$$\text{height M} = \frac{\text{height A} + \text{height B}}{\quad} + \text{RAND (distance B} - \text{distance A)}$$

All that we needed now is to use this simple rule to create a landscape in three dimensions, which involves adding a second axis (Y).

In the three dimensional program, listing two for each pair of points which make up the line in listing one we are now considering for points which make a square and we are calculating the midpoints each edge and of the centre – a, b, c, d, and m of figure two. The subroutine "sub 1"

calculates those midpoints, the WHILE..WEND loop and the pair of FOR...NEXT loopes ensure that they are calculated for all points in the array in much the same way as listing one.

<<< List "PROG1-2.BAS" here >>>

On running this program a pattern will build up. Long before it is complete you will be able to determine the general shape. As the program progresses, more detail will be revealed. If we imagine that all the black and blue areas are seas and the green and brown regions are land masses, the final image looks convincingly like a contour map with the coastline having the characteristic crinkliness of a Norwegian fjord. Change the variable "size" to 128 to produce figure three; this will take some time to plot.

To view this map in a three-dimensional isometric form, like those used to illustrate geography text books, add subroutine 5 to the end of the program.

Sub 5:

<<< List "SUB-5.BAS" here >>>

and call it from line 1180 thus:

1180 GOSUB 1500

The result of this additional routine is shown in figure four which, although lacking in perspective, resemble a section of a landscape.

The slow Basic routine for calculating the fractal will be replaced next month by a faster machine code version and the beginings of the Landscape Generator Program will begin to emerge. The following month we will convert the isometric projection routine of subroutine 5 into a true perspective image. In the meantime, experiement with the routines and see what can be achieved by modifying the program.

```
FRactal Landscapes              Program 2        Article 1
1000 ' 3-D Fractal Landscapes
1010 ' Program 2
1020 '
1030 '
1040 DEFINT a-z: INPUT "Enter Seed:";iseed
1050 GOSUB 1380: MODE 0: xscale=4: yscale=2: RANDOMIZE (PI+iseed\PI):
     PRINT "Seed =";iseed
1060 size=64: DIM height[size,size]: maxheight=400/2
1070 GOSUB 1300 ' prime corners
1080 midx=0: midy=0: midpoint=size: maxh=maxheight/4
1090 WHILE midpoint>1
1100  half=midpoint/2
1110  FOR midy=size-half TO half STEP -midpoint
1120   FOR midx=half TO size-(half) STEP midpoint
1130    GOSUB 1440 ' calculate fractals
1140   NEXT
1150  NEXT
1160  midpoint=half: maxh=maxh / 2
1170 WEND
1180 GOSUB 1500
1190 END
1200 ' sub 1
1210 ' put number into array and plot value
1220 '
1230 IF height[dx,dy]<>0 THEN GOTO 1260
1240 height[dx,dy]=r: ik=r \ (maxheight/15)+1
1250 PLOT dx*xscale,dy*yscale,ik
1260 RETURN
1270 ' sub 2
1280 ' prime corners
1290 '
1300 dx=0:     dy=0:     r=RND*maxheight/2: GOSUB 1230
1310 dx=0:     dy=size:  r=RND*maxheight/2: GOSUB 1230
1320 dx=size:  dy=0:     r=RND*maxheight/2: GOSUB 1230
1330 dx=size:  dy=size:  r=RND*maxheight/2: GOSUB 1230
1340 RETURN
```

```
1350 ' sub 3
1360 ' set inks
1370 '
1380 FOR i=0 TO 15: READ j: INK i,j: NEXT
1390 DATA 13,0,1,2,5,11,3,9,10,18,21,19,20,23,24,26
1400 RETURN
1410 ' sub 4
1420 ' calculate midpoint fractals
1430 '
1440 dx=midx: dy=midy-half:
     r=(height[dx-half,dy]+height[half+dx,dy])/2+2*(RND-0.5)*maxh: GOSUB
30
1450 dx=midx: dy=midy+half:
     r=(height[dx-half,dy]+height[half+dx,dy])/2+2*(RND-0.5)*maxh: GOSUB
30
1460 dx=midx-half: dy=midy:
     r=(height[dx,dy+half]+height[dx,dy-half])/2+2*(RND-0.5)*maxh: GOSUB
30
1470 dx=midx+half: dy=midy:
     r=(height[dx,dy+half]+height[dx,dy-half])/2+2*(RND-0.5)*maxh: GOSUB
30
1480 dx=midx: dy=midy:
     r=(height[dx-half,dy]+height[dx+half,dy]+height[dx,dy+half]
+height[dx,dy-half])/4+2*(RND-0.5)*maxh:
GOSUB 1230
1490 RETURN
1500 ' sub 5
1510 ' isometric projection
1520 '
1530 FOR j= size TO 0 STEP -1
1540  FOR i=0 TO size
1550   r=height[i,j]: ik=r \ (maxheight/15)+1
1560   MOVE 300+(i-j)*xscale/2,128+(i+j)
   *yscale/2,ik
1570   DRAWR 0,height[i,j]
1580  NEXT i
1590 NEXT j
1600 RETURN
```

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Mode 3 is a two-screen, four colour, Mode 0 that lets you have data on the background screen which you can't see, but which is nevertheless there. Very fast animation can be created by flipping instantly from the foreground to the background screen. *January 1986.*

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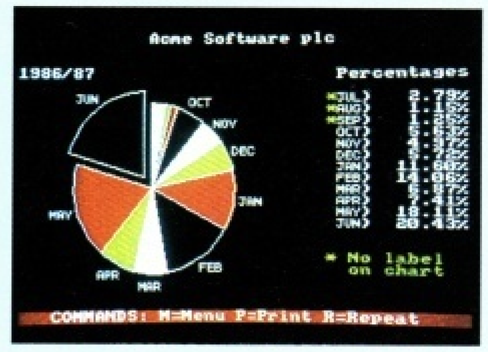
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If you look in wonder at arcade games in which spaceships whizz over a planet's surface at one million miles per hour and wish that you could write a program to do that, then you need Justin's Scroll. Peter Green adapted this program for the scrolling in Rimrunner, and the Zeit Corporation found it came in useful for BMX Kidz. This *is* how the professionals do it. *June 1987.*

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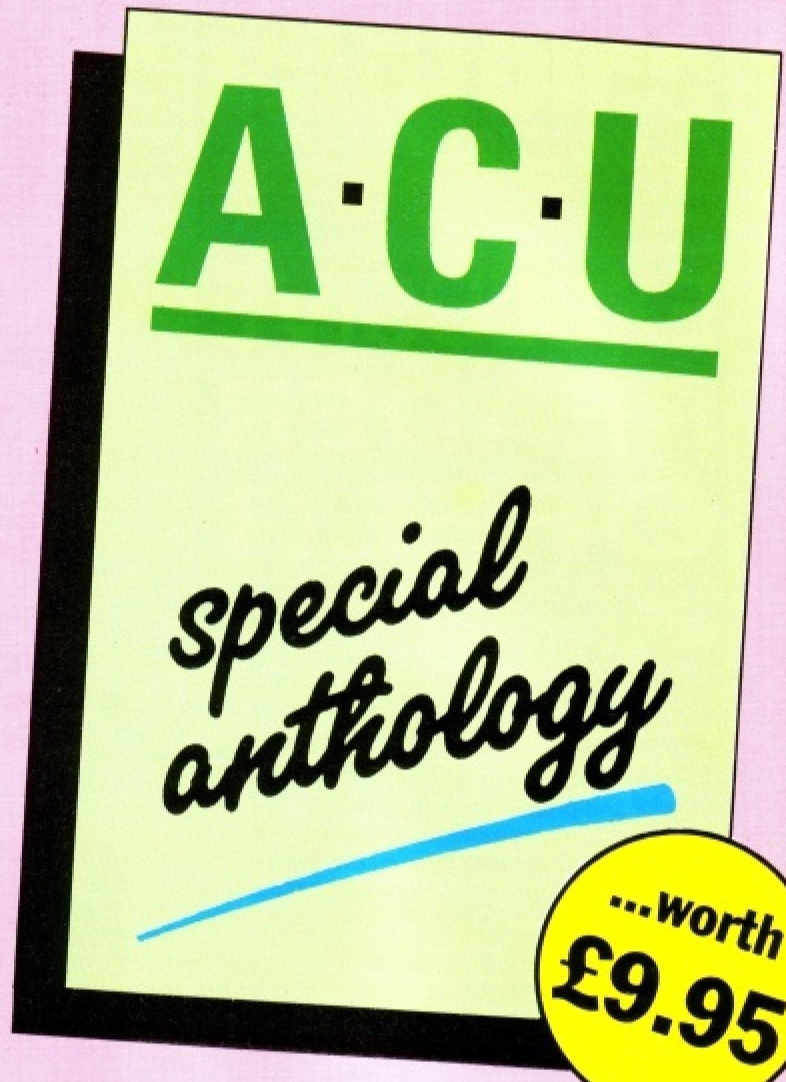
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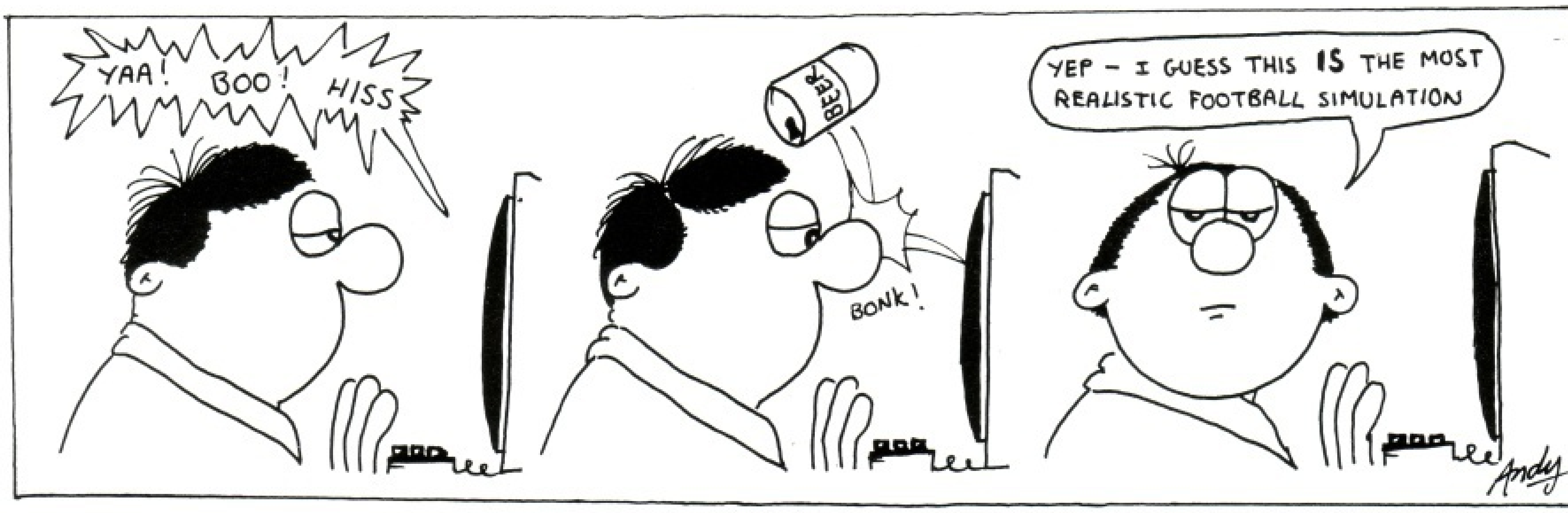
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Swift Software is a new force in top quality, low cost software. Due to our buying power we can purchase software at probably the lowest prices. In return we pass these discounts on to you - with our 10 day money back guarantee.

As part of a special promotion we have teamed up with Arnor to provide the best ever deal on their range of CPC products. Many prices have been slashed by over 30%, and you can save a massive £25 if you buy the Rombo & Protext Startup kit!

Remember, these prices can only be held this low for a limited period, so send in your order today!

This advert was created using Protext, Promerge Plus and a Citizen Overture 106 lazer printer

Protext

- Without doubt the most sophisticated word processor you'll find on any home micro. Its ease of use and advanced range of features are normally only found in business systems costing many times more. Protext is the number one word processor for the CPC!

* Extra fast
* Works with any printer
* Flexible find and replace
* Complete control over page layout
* Word count
* Many print options.

	Disc	Rom
RRP	£26.95	£39.95
Our Price	£19.50	£29.50
you save	£7.45	£10.45

Prospell

- With Prospell you can produce 100 per cent error-free documents, eliminating odd words and dubious spellings. You can also add words to create your own dictionary.

* Can check Protext text in memory
* Works with Tasword, Amsword, and Wordstar
* Over 33,000 word dictionary
* Checks at up to 2,000 words per minute
* Finds words and anagrams

	Disc	Rom
RRP	£24.95	£34.95
Our Price	£18.50	£24.50
You save	£6.45	£10.45

Promerge

-Promerge is more than just a simple mailmerger for standard letters. It includes powerful mathematical and text functions and, of course, integrates perfectly with Protext.

* Read data from keyboard or file
* Conditional printing
* Microspacing
* Typewriter mode
* Link files at print time
* Reformat while printing

	Disc
RRP	£24.95
Our Price	£19.50
You save	£5.45

Promerge Plus

- This rom offers all the features of the Promerge disc plus, among other features:

* Two file editing
* Background printing
* Box/column mode

	Rom
RRP	£34.95
Our Price	£24.50
You save	£10.45

Maxam

- The standard Assembler/Monitor/Editor for developing Z80 machine code. Used by many top software houses, this is an essential utility if you want to create machine code programs.

* Plain English error messages
* Disassembler
* Memory editor
* Full screen program editor
* Mix Basic and machine code

	Disc	Rom
RRP	£26.95	£39.95
Our Price	£19.50	£29.50
You save	£7.45	£10.45

Maxam 1.5

- Enhanced version of the extremely successful assembler/monitor, designed to be used from Protext. The editor has therefore been removed, leaving room for many new features.

* Assemble from within Protext
* Comprehensive diagnostics
* Change register contents
* Resume from breakpoints
* Load/save machine code directly
* many new assembler directives
* All other features retained

	Rom
RRP	£29.95
Our Price	£22.50
You save	£7.45

BCPL

- One of the fastest, most flexible programming languages for the CPC. It is the precursor to C and has been used to write many operating systems and other major programs where speed is essential.

* Comprehensive I/O libraries
* Create your own function libraries
* Full control of graphics and sound
* Example source files
* 60 page manual
* Full screen editor and space Invader game supplied

	Disc	Rom
RRP	£24.95	£29.95
Our Price	£19.50	£22.50
You save	£5.45	£7.45

Utopia

- Once you have installed Utopia you won't know how you managed without it! It gives you 50 new commands - all of which are available without having to write a single program.

* Text and graphics screen dumps
* Disc utilities - format, copy, sector editor and much more.
* Automatically set function keys
* Virtually unlimited function key space
* Basic programming utilities
* Rom management commands
* Easy access to REN and ERA on a 464

	Rom
RRP	£29.95
Our Price	£22.50
You save	£7.45

There's never been a cheaper way to get into rom software!

Rombo & Protext startup kit - The Rombo is a sturdy box which can hold up to eight roms. And if you run out of room, you can simply add another. It comes with a cover, so you can keep your roms safe from dust and damage. Combined with Protext, the fastest, most reliable and biggest selling Wordprocessor for the CPC, you'll have a setup to rival systems many times the price.

* Protext instantly accessible
* Seven free sockets
* Select high or low bank (allowing addition of 2nd rom box)
* On/off switch for each rom
* In and out expansion port sockets

RRP	**£74.90**
Our Price	**£49.50**
You save	**£25.40**

ORDER FORM

Please send me the following items:
(Please tick)

	Disc		Rom	
Protext & Rombo	-		£49.50	[ ]
Protext	£19.50	[ ]	£29.50	[ ]
Promerge	£19.50	[ ]	-	
Promerge Plus	-		£24.50	[ ]
Prospell	£18.50	[ ]	£24.50	[ ]
Utopia	-		£22.50	[ ]
Maxam	£19.50	[ ]	£29.50	[ ]
Maxam 1.5	-		£22.50	[ ]
BCPL	£18.50	[ ]	£22.50	[ ]

I enclose a cheque / PO made payable to *SWIFT SOFTWARE*

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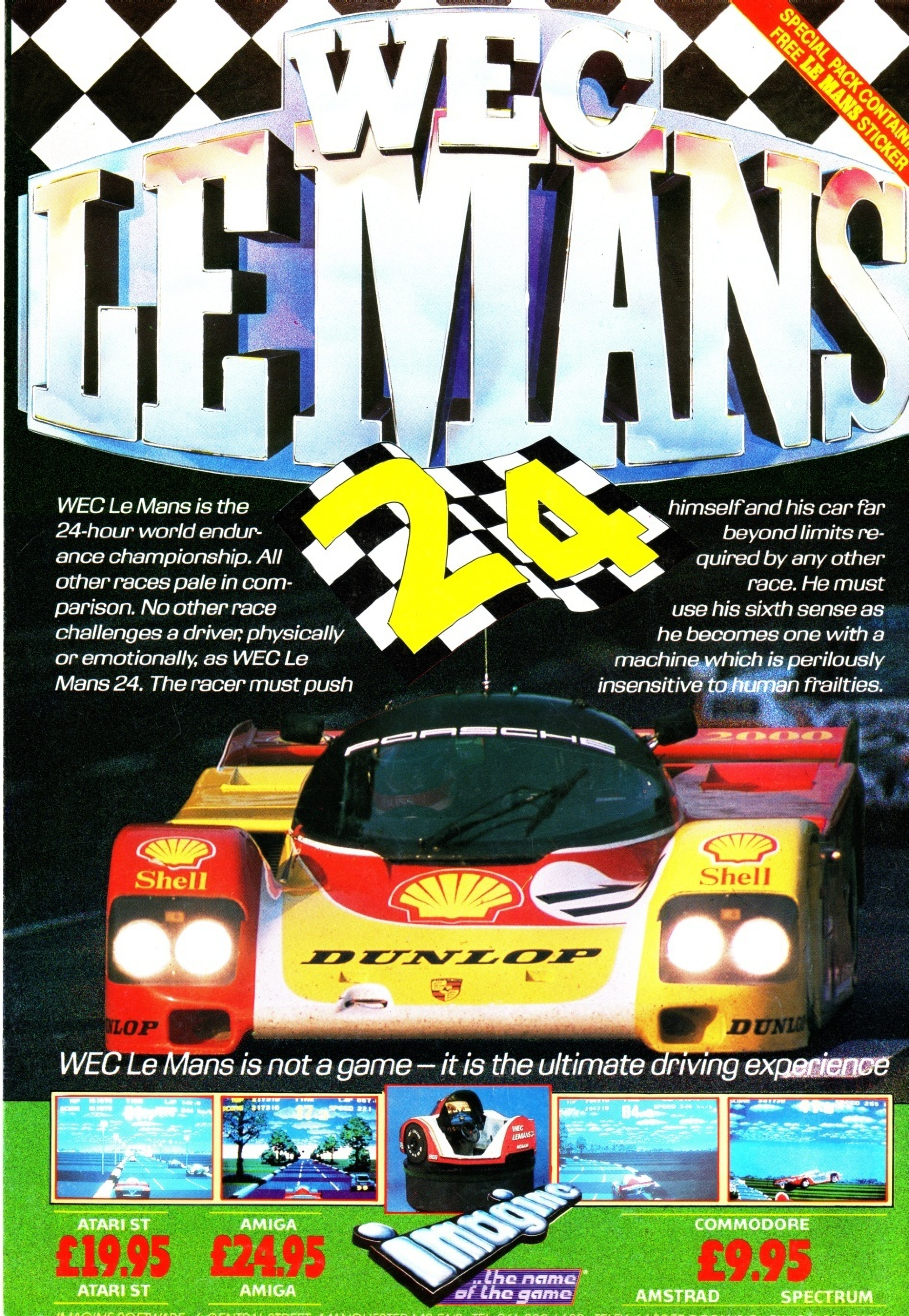
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WEC LE MANS
24
WEC Le Mans is the 24-hour world endurance championship. All other races pale in comparison. No other race challenges a driver, physically or emotionally, as WEC Le Mans 24. The racer must push himself and his car far beyond limits required by any other race. He must use his sixth sense as he becomes one with a machine which is perilously insensitive to human frailties.
WEC Le Mans is not a game – it is the ultimate driving experience
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